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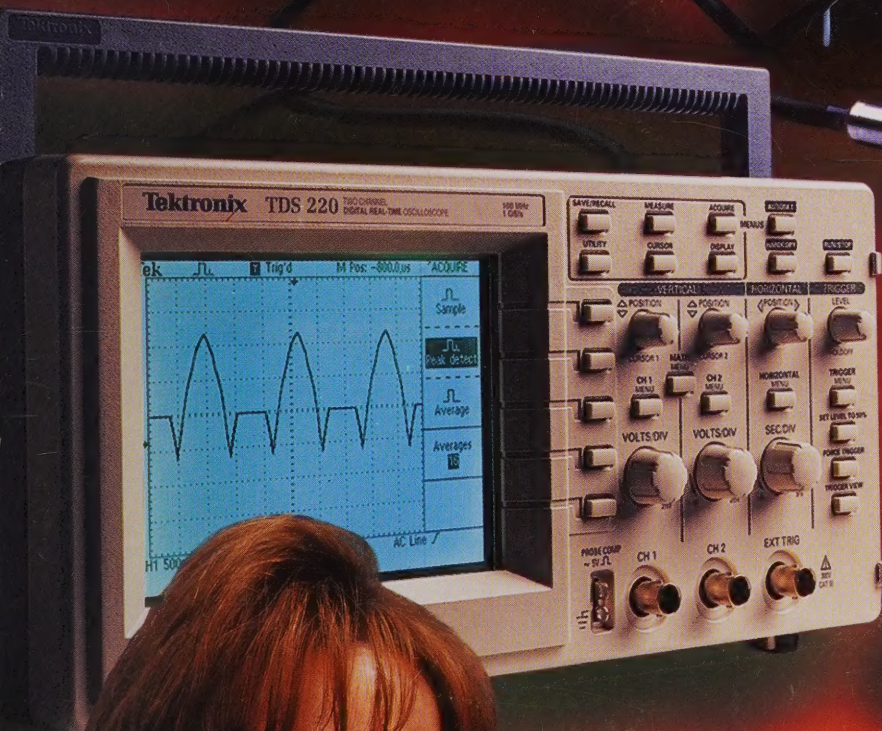
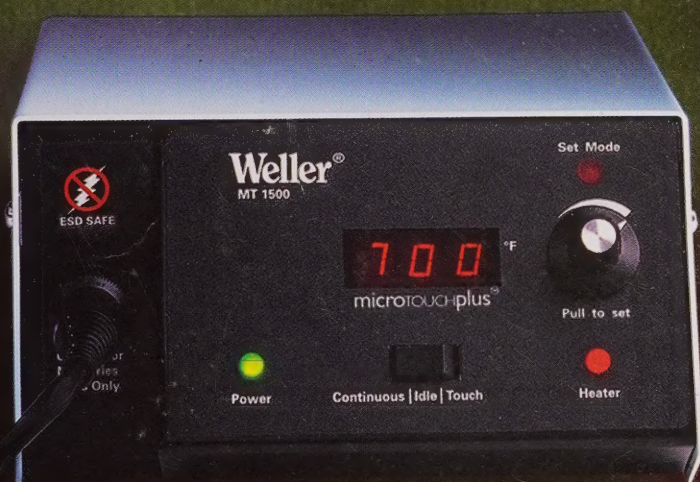
## 1999 Production Supplies and Test Equipment Catalog

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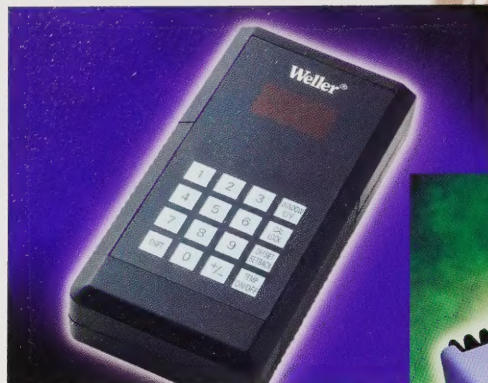
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Day, 7 Days a Week"**







# The Weller Silver Series.

## The 80 Watt Power Trip.

From the moment you set the temperature on the new WSD80, you get the feeling that something's different. And you're right. Because at that very moment, well beyond the sharp digital display, the powerful 80 watt heating element within the new WSD80 iron is transferring heat from the iron to the tip. It's a process that requires only a few seconds of your time. Once the heat arrives, our new low-mass tips maintain a consistent working temperature with minimal idling



and 10% faster heat recovery than regular tips. You can choose from over ten connectable accessories to use with the WSD80, including soldering pencils, heated tweezers and thermal wire stripping tools. And the optional calibration box allows you to easily program three functions: timed set back, variable temperature lock-out and calibration. The WSD80, one of three stations in the new Weller Silver Series. The power to get things done.

**Weller®**

For additional information please visit the @ONCE web site at [www.4atonce.com](http://www.4atonce.com) or call (800) 261-9602, Ext.4002

See page 54  
for details

**COOPER Tools**

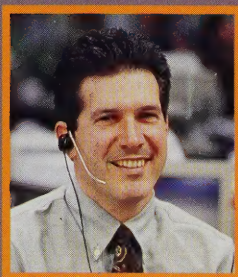


**W**elcome to the 1999 Production Supplies and Test Equipment catalog. This latest edition is our biggest, and best ever! Inside you will find an expanded selection of test equipment from manufacturers such as Fluke, Tektronix, and Hewlett Packard, plus a wide selection of production supplies, hand tools, solder and desolder supplies, workstations, and much, much more. And, as always, when you order from @Once you get:

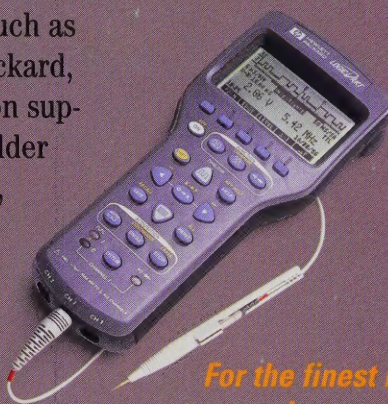
- No-Minimum Ordering
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- Competitive Pricing
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Please take a moment to look through our catalog. Be sure to check out the newest and hottest products in our "What's New" section. We are certain you will find @Once to be a great one-stop-shop for all your production supply and test equipment needs. But if you don't see what you need, just call.

To order, just pick up your phone. Call us at 800 765-6268, send us a fax at 800 950-5679, or visit our web site at [www.4atonce.com](http://www.4atonce.com).



**If You Don't See What You Need, Just Give Us a Call, Chances Are We Have It In Stock.**



*For the finest in test equipment from the industry's leading manufacturers, start on page **6**.*



*For a great selection of soldering, desoldering, and SMT tools, start on page **52**.*



*For a wide assortment of the best tools in the electronics' industry, start on page **114**.*

## What's New

The latest the industry has to offer in test equipment and production supplies

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## Test Equipment

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- Oscilloscopes
- Probes, accessories
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192





# What's **NEW**

*Of the many new items you'll find in this catalog, we've selected a few of the hottest products to feature here. You'll definitely want to check out these cutting-edge production supplies and test equipment.*

## Test Equipment

PAGE  
**14**

## Tektronix

### TEKTRONIX TX Series True-RMS Multimeters

The TX Series meters don't make you sacrifice ruggedness, safety, and quality to enjoy the accuracy and features you need in today's changing maintenance environment. Plus, they come with extralarge, dual numeric displays that provide more information in fewer steps.



PAGE  
**37**

## GLOBAL SPECIALTIES

### GLOBAL SPECIALTIES Hand-Held Frequency Counter

GLOBAL SPECIALTIES' frequency counter is not only compact and battery-powered, it also provides you with the bench-top performance and convenience of a hand-held meter. The counter displays measurement function, time, and units, plus overflow, trigger activity, and low battery.



## Soldering, Desoldering and SMT

PAGE  
**54**

## Weller®

### WELLER Silver Series Soldering Stations

Silver Series stations are designed to maximize workspace and to give you 80 W of heat power when you need it. These new stations increase your ability to work on high-mass components where greater controlled power is required.

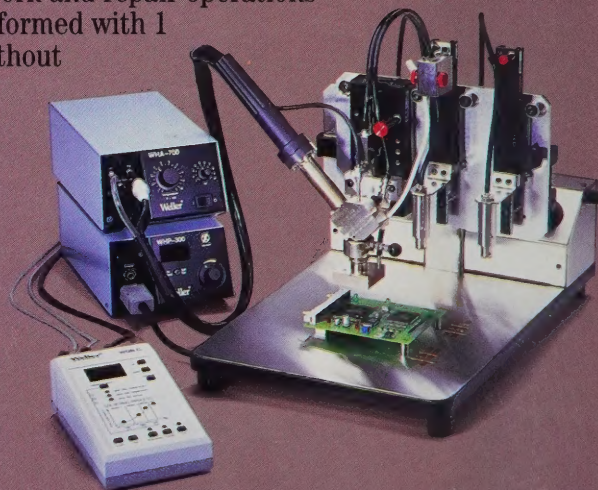


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**77**

## Weller®

### WELLER WQB2000 BGA/SMT Rework & Repair System

This is the perfect system for complete rework and repair of BGA and SMT devices without causing any thermal or physical damage. The patented technology enables complete rework and repair operations to be performed with 1 unit—without a vision system.





*Static Control***PAGE  
92****3M****3M 4600 Series Wrist Straps and Cords**

These colorful wrist straps provide high visibility and come at a good price. They are lightweight, low profile, and make good contact with the skin—assuring employee acceptance. The straps are available in a variety of bright colors.

*Hand Tools***PAGE  
124****XCELITE****XCELITE XP1 Screwdriver**

The 2 speeds and 8-stage adjustable clutch—to precisely control torque—make this motor-driven cordless screwdriver a great tool for the professional.

*Workstations & Material Handling***PAGE  
197****BEVCO****BEVCO 7000 Series Polyurethane Seating**

This tuff, durable seating will serve you well for a long period of time, because it is made from the same rugged polyurethane material that is used in the steering wheel of your car—but it's enhanced to provide you with seating comfort and static control. The long-lasting polyurethane seat and backrest resist stains, punctures, and damage from water, chemicals, oils, and grease.

**PAGE  
106****TEXWIPE****TEXWIPE ESD Wipe**

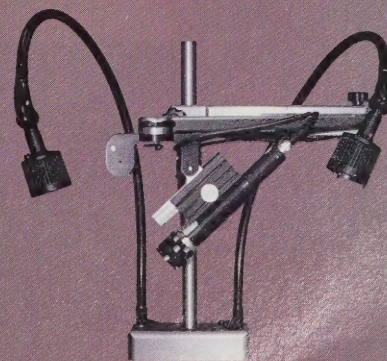
This new static-dissipative wiper is great for ESD-sensitive electronics manufacturing. It is uniquely suited for dry use in clean-room environments and is excellent for applications requiring assured ESD performance.

*Solder & Chemicals***PAGE  
161****LOCTITE****LOCTITE DURABOND Epoxy Adhesives**

These LOCTITE DURABOND products are application-specific and designed to outperform the competition in all respects—better adhesion, better flow, less odor, improved clarity, higher strength, and improved durability.

*Lighting & Magnification***PAGE  
186****SONORA****SONORA INSPECTACAM Video Inspection System**

The SONORA INSPECTACAM lets you take a good close look at what you are doing. Use it to enhance your training and communications, to locate tiny defects in workmanship, or to do high-quality rework.





# The award-winning THS700A Series

**Now with a 200-MHz Version  
(the Highest-Performance  
Hand-Held Scope in the  
Market)**

## TEKTRONIX TEKSCOPE® Hand-Held Digital Scope

The TEKSCOPE THS700A Series scope/DMM combines a full-featured digital real-time oscilloscope with a true-RMS digital multimeter in a rugged battery-operated instrument. Scope and meter modes can operate simultaneously and independently on the same or separate signals. A high-resolution backlit display and pop-up menus make it easy to take full advantage of the instrument's many features, including: cursors; video trigger; voltage and resistance measurements; and storage of waveforms, data, and instrument setups. In addition, they offer the most comprehensive set of triggering capabilities, including: external trigger and extensive triggering (delay, pulse width, and video).

### THS730A

- True 200-MHz bandwidth • 1 GS/s per channel
- Enhanced pulse, width, and video triggering
- True-RMS on DMM with data logger • dB and

dBm DMM measurement capability • RS-232 communications port • Bright, clear display

**THS730A, THS720A, and THS710A includes:**

- P6117 10x passive probes (2) • User manual
- Quick-reference manual • Standard meter lead set • Nicad rechargeable-battery pack • AC power adapter • Soft carrying case • Cable and adapters for RS-232 • NIST-traceable certificate of calibration

P/N	Description	1-3	4+
THS710A	60 MHz, 250 MS/s	\$2195.00	\$2096.00
THS720A	100 MHz, 500 MS/s	2295.00	2195.00
THS730A	200 MHz, 1 GS/s	3295.00	3150.00
A621	1,200-A-AC current probe	390.00	—
A622	AC/DC current probe	415.00	—
P5102	100-MHz, 10x passive probe	199.00	—
THS7HCA	Hard carrying case	195.00	—
THS7BAT	Rechargeable battery	65.00	—
THS7CHG	Battery charger	205.00	—

Features	THS710A	THS720A	THS730A
Bandwidth	60 MHz	100 MHz	200 MHz
Sample Rate (Each Channel)	250 MS/s	500 MS/s	1 GS/s
Time/Division Range	10 ns/Div. to 50 s/Div.	5 ns/Div. to 50 s/Div.	2 ns/Div. to 50 s/Div.
Channels	2	2	2
Max. Record Length	2,500	2,500	2,500
Glitch Capture	8 ns	8 ns	8 ns
Single-Shot BW (2 ch., 5 pt.)	60 MHz	100 MHz	200 MHz
Vertical Sensitivity	5 mV–50 V Per Div.	5 mV–50 V Per Div.	5 mV–50 V Per Div.
DC Voltage Ranges	400 mV–880 V	400 mV–880 V	400 mV–880 V
True-RMS AC Voltage Ranges	400 mV–640 V	400 mV–640 V	400 mV–640 V
Advanced Triggering	Video, Pulse, Width	Video, Pulse, Width	Video, Pulse, Width
Memories	10 Setups, 10 Waveforms	10 Setups, 10 Waveforms	10 Setups, 10 Waveforms
Warranty	3 Years	3 Years	3 Years

# Tektronix



THS730A

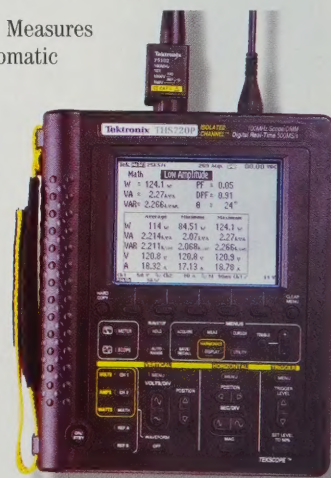
THS7HCA

## TEKTRONIX Hand-Held Digital Electric Power TEKSCOPE™

The THS720P includes features specifically for electric/power electronics measurements which allow you to test and verify the correct operation of motors, check transformer efficiency, verify power-supply performance, and measure the effect of a neutral current. It also includes the powerful features of a modern oscilloscope which enables you to troubleshoot and verify complicated electronic control circuits that control high-voltage power-electronics circuitry.

- Ideal for electrical-power applications • Measures harmonics up to 31st (50 Hz/60 Hz) • Automatic power measurement with statistics
- Independently floating isolated scope and DMM channels for safety • Full floating measurement capability up to 600 V RMS • 1-kV high-voltage probes
- PWM electric motor drive trigger
- 100-MHz bandwidth with 500 MS/s sampling rate per channel • 2 channels, 2 digitizers

Includes: Two P5102 10x high-voltage passive probes, user manual, quick reference manual, standard meter lead set, nicad rechargeable-battery pack, AC power adapter, soft carrying case, cable and adapters for RS-232, and NIST-traceable certificate of calibration



THS720P

P/N	Description	1-3	4+
THS720P	Power and harmonics tester	\$3195.00	\$3056.00
P5102	100-MHz, 10x passive probe	199.00	—



# The world's most advanced multimeters

## FLUKE 860 Series GRAPHICAL™ Multimeters

FLUKE GRAPHICAL multimeters measure DC voltage with an extraordinary 0.025% accuracy and current with a resolution as low as 10 nA. GMMs also measure true-RMS AC voltage and resistance with exceptional accuracy. In addition, these familiar multimeter functions are supplemented by capacitance, conductance, frequency, duty-cycle, pulse-width, period, and dB measurements. Having this wide array of capabilities in a single unit means you need to carry fewer instruments to the job.

- **New!**—bright, high-contrast backlight on Model 867BE • 0.025% basic DC accuracy • Current measurements down to 10 nA on the 867BE, 1 µA on the 863E • TRENDGRAPH™—an electronic chart recorder • 1-MHz waveform display • Computer interface for measurements and settings transfers • Component-signature display (867BE only) • Logic-activity display (867B only) • In compliance with IEC 1010-1 Cat III 1,000 V

### Powerful Troubleshooting and Reporting Capabilities— Not Generally Found in Field Multimeters

- Optically-isolated RS-232 interface for printing and transferring measurement data • Optional

SC860 software-and-cable kit for communicating with a PC—for documenting, analyzing, and storing measurements • TRENDGRAPH—works like an electronic chart recorder, plotting high-resolution meter readings up to 30 h, in intervals from 1 s to 15 min • AUTODIODE™—provides a fast-and-easy way to test diodes and transistors—it electronically reverses leads and shows proper diode polarity

### The 867BE Adds the Following Features:

- Screen memories—to carry field measurements back to the lab • “Component test” (the ability to plot characteristics of resistors, capacitors, diodes, transistors, FETs, and any combination of components) to show V-I component signatures on the GRAPHICAL display • Logic-activity mode—for a simple way to isolate digital failures—it indicates logic transitions to 10 MHz and shows if a circuit is active or stuck high or low—it also shows the frequency of activity and average DC voltage

**FLUKE®**



867BE

P/N	Description	1-3	4-9	10+
863E	GRAPHICAL multimeter	\$595.00	\$576.00	\$562.00
867BE	GRAPHICAL multimeter	795.00	769.00	747.00
SC860	FLUKEVIEW 860 software and optically-isolated RS-232 cable	245.00	—	—
PAC91	Printer adapter cable (optical to parallel)	195.00	—	—
C789	Carrying case with shoulder strap	80.00	—	—
C781	Compact carrying case	39.00	—	—

Features	863E	867BE
Basic DC Accuracy	0.04%	0.025%
30-mA DC Current Accuracy	0.1% ±15 Counts	0.05% ±15 Counts
Frequency Counter Range	2 MHz	10 MHz
Meter AC Bandwidth (-1dB)	300 kHz	300 kHz
High-Intensity Backlight		•
Screen Memories		3
Logic Activity		•
Component Test		•
Rechargeable Batteries and Line Adapter		•

## FLUKE 787 PROCESSMETER™

The 787 PROCESSMETER puts a complete troubleshooting solution into the palm of your hand. Get in touch with more information, faster and easier with the newest member of the FLUKE 80 Series. The 787 provides the measurement capabilities you would expect from our rugged, reliable DMMs plus the ability to source, simulate, or measure DC current with 1-µA resolution and 0.05% accuracy. Put it all together and you have the ideal tool for troubleshooting and calibrating current-loop applications.

### Precision 1,000-V, 440-mA DMM

- Measure AC and DC volts, AC and DC current, resistance, continuity, and frequency • 0.1% DC voltage accuracy • 0.05% DC current accuracy, 1 µA resolution to 30 mA • Simultaneous mA and %-of-scale readout • True-RMS AC voltage measurement to 1 kHz • Frequency measurement to 20 kHz • Min., max., average, TOUCHHOLD, and relative modes • Diode test and continuity beeper

### DC Current-Source/Loop Calibrator

- 20-mA current source/simulator • Simultaneous mA and %-of-scale readout • Manual step (25%,

### Specifications

Measurement Function	Range and Resolution	Best Accuracy (% of reading + LSD)
DC Volts	400.0 mV, 4.000 V, 40.00 V, 400.0 V, 1,000 V	0.1% + 1
AC Volts (True-RMS)	400.0 mV, 4.000 V, 40.00 V, 400.0 V, 1,000 V	0.7% + 4
DC mA	30,000 mA	0.05% + 2
DC Amps	1.000 A (0.440 A continuous)	0.2% + 2
AC Amps	1.000 A (0.440 A continuous)	1% + 2
Resistance	400.0, 4.000 k, 40.00 k, 400.0 k, 4.0 M, 40 M	0.2% + 1
Frequency (0.5 Hz–20 kHz)	199.99 Hz, 1,999.9 Hz, 19,999 kHz	0.005% + 1
Diode Test	2,400 V (measures diode voltage drop)	2% + 1
Continuity	Beeps for resistance <approx. 100	

NOTE: Temperature range of 18 °C to 28 °C for 1 year after calibration.

Output Function	Range and Resolution	Drive Capability	Accuracy (% of Span)
DC Current Output (Internal Battery Operation)	0.000 mA–20,000 mA or 4,000 mA–20,000 mA (selectable at power-up) Overrange to 24,000 mA	12 V compliance or 500 V @ 20 mA	0.05%
DC-Current Simulate (Ext. 24-V-Loop Supply)	0.000 mA–20,000 mA or 4,000 mA–20,000 mA (selectable at power-up) Overrange to 24,000 mA	1,000 V @ 20 mA	0.05%
Current-Adjustment Modes	Manual: coarse, fine, 25% step Automatic: slow ramp, fast ramp, 25% step		

course, fine) plus auto-step and auto-ramp

### Additional 787 Features

- Clear LCD with backlight, 4,000 counts (30,000 counts for DC current) • Externally accessible battery for easy battery changes • 1,000-V overload protection on voltage, ohms, and frequency • 150-V overload protection on mA—backed up by a 440-mA, 1,000-V fuse
- Includes: • C81Y protective yellow holster with FLEX-STAND • TL75 safety-designed test-lead set • AC70A alligator clips • 9-V alkaline battery (installed) • User's manual and quick-reference guide



787

P/N	Description	1-3	4-9	10+
787	PROCESSMETER	\$495.00	\$462.00	\$433.00



## FLUKE SCOPEMETER® B

It works  
wherever  
you work

The SCOPEMETER B is a truly integrated digital-storage oscilloscope and digital multimeter.



FLUKE® is the leader in compact, professional electronic test tools—tools to facilitate high-quality work in less time, tools compact enough to be taken directly to the point where they can do the most good.

**Model 92B**

The Model 92B features a bright, analog-like fluorescent backlit display; video triggering; continuous autoset; a full-featured true-RMS multimeter with special modes; frequency counter; direct-access measurement menu; TRENDPLOT™ with time and date; current-clamp scaling; and on-line help messages. Screen transfers can be made to a PC (optional interface cable required). The Model 92B is sealed against the elements and protected by a shock-resistant holster with battery or AC line power.

**Model 96B**

Adding to the capabilities of the Model 92B, the 96B provides measurement cursors, 30 k SCOPERECD™, and memory functions that save graphic screen images, capture waveforms, and enable front-panel setups. Like the 92B, screen transfers can be made to a PC. Screen readout(s) and waveform(s) can be transferred directly to a printer, using the optional printer cable.

**Model 99B**

All the performance and features of the Model 96B, plus waveform math/filter capability, 100-MHz bandwidth, a signal generator, component tester, and more memory storage for screens, waveforms, and setups. Offering remote operation over an RS-232 interface cable, the Model 99B is portable, powerful, and easy to use.

5 SCOPEMETER B MODELS are available from FLUKE—providing unequalled versatility.

The Model 123 features CONNECT-AND-VIEW™ hands-off operation.



P/N	Description	1-3	4-9	10+
92B/003	SCOPEMETER	\$1495.00	\$1437.00	\$1367.00
96B/003	SCOPEMETER	1795.00	1725.00	1641.00
99B/003	SCOPEMETER	2195.00	2110.00	2007.00
105B/003	SCOPEMETER	2595.00	2495.00	2373.00

P/N	Description	1-3	4-9	10+
123	SCOPEMETER	\$1195.00	\$1157.00	\$1111.00
123/S	123 with cable, software, and hard case	1490.00	1445.00	1395.00



SCOPEMETER B is a battery-powered combination scope and meter designed for on-the-go measurements. Just push the **"measure" menu button**, select one of 30 measurements, and the SCOPEMETER B automatically configures itself to take the desired reading.

With SCOPEMETER B, good waveforms are automatic. While probing from test-point to test-point, the **continuous-auto-set feature** instantly adjusts the time-base and amplitude. Manual controls are still there, but SCOPEMETER B is so fast and easy, why use anything else.

Designed with a sealed, rugged case, the SCOPEMETER B performs reliably even in wet, dusty, or dirty environments. And the new bright fluorescent backlit screen makes for easy readings in bright-light and no-light situations.

**FLUKE®**

### Model 105B

The Model 105B has all the features of the 99B, including a 100-MHz input bandwidth, video triggering, 30-k SCOPERECD™, and 4-h nicad battery. The wider bandwidth is ideal for high-end users accustomed to a 100-MHz scope for catching those fast edge signals. The 105B includes FLUKE-VIEW™ SCOPEMETER software, the PM 9080/001 interface cable, and the C97 hard carrying case.

### Model 123 CONNECT-AND-VIEW™

This meter is the ideal choice for technicians troubleshooting industrial machinery, instrumentation, and control and power systems. It is a rugged and reliable hand-held dual-input scope and meter with "paperless" recording capabilities. Its new and patented CONNECT-AND-VIEW™ hands-off operation saves time in fault finding.

- Helps to minimize the downtime in production and manufacturing systems
- Intuitive ease of use with unique "single test lead does all measurements" capability
- One and the same test lead for waveform display, multiple meter readings, capacitance and resistance measurements, and continuity checking

## Selection Guide for Hand-Held Digital-Storage Oscilloscopes

Oscilloscope Features	Fluke 105B	Fluke 99B	Fluke 96B	Fluke 92B	Fluke 123
Bandwidth	100 MHz	100 MHz	60 MHz	60 MHz	20 MHz
Max. Repetitive Sample Rate	5 GS/s	5 GS/s	2.5 GS/s	2.5 GS/s	1.25 GS/s
Number of Channels	2 + Ext. Trig	2 + Ext. Trig	2 + Ext. Trig	2 + Ext. Trig	2
Rise Time	<3.5 ns	<3.5 ns	<5.7 ns	<5.7 ns	<17.5 ns
Time/Division	5 ns–60 s	5 ns–60 s	10 ns–60 s	10 ns–60 s	20 ns–60s
Volts/Division	1 mV–100 V	1 mV–100 V	5 mV–100 V	5 mV–100 V	5 mV–100 V
Record Length (Bytes)	512	512	512	512	512
SCOPERECD™, 30-k Memory	•	•	•	•	
Screen/Waveform/Set-Up Memories	10/20/40	10/20/40	5/10/20		2/0/10
Continuous Auto-Set	•	•	•	•	•
Glitch Capture Down to 40 ns	•	•	•	•	•
Video Triggering, NTSC, PAL, SECAM, and High-Resolution Video (Line and Field Selectable)	•	•	•	•	•
External Triggering	•	•	•	•	Optional Ext. Trig. Pod
Pre- and Post-Trigger Adjustment In Divisions	-20 to +640	-20 to +640	-20 to +640	-20 to +640	-10 to +10
Envelope Mode (Min./Max.) and Waveform Smooth	•	•	•	•	•
Measure Amps with Optional Current Clamps	•	•	•	•	•
Cursor Measurements	•	•	•		
Waveform Math (Integrate, +, -, Filter)	•	•			
<b>Autoranging True-RMS Multimeter Features</b>					
Number of DMM Channels	1	1	1	1	2
Display Readout (Basic DC Accuracy 0.5%)	3,000 Counts	3,000 Counts	3,000 Counts	3,000 Counts	5,000 Counts
Advanced Measurements (Temp., Current, % Duty, Pulse Width, dB, Hz, Amps, and More)	•	•	•	•	•
Diode Test and Continuity Beeper	•	•	•	•	•
Min./Max. TRENDPLOT with Time and Date Stamp	1 Channel	1 Channel	1 Channel	1 Channel	2 Channel
DMM Measurements with Waveforms	•	•	•	•	•
Capacitance					50 nF–500 µF
<b>General Features</b>					
High-Contrast, Grey-Scale, Backlit Display	•	•	•	•	•
Waveform and Screen-Image Transfers to a PC and Remote Operation	•	•	•		•
Screen-Image Transfers to a PC	•	•	•	•	•
4-h Nicad-Battery Operation and Charger	•	•	•	•	•
Optically-Isolated RS-232C Interface for Printer and PC Interface Cable (Optional-Included in 105B)	•	•	•	•	•
Online Help (Information)	•	•	•	•	
EN61010-1 and UL Listed for 600 V RMS, CSA Approved	•	•	•	•	UL 3111-1
Automatic Setup Measurements	40	40	40	28	26
Signal-Generator/Component-Tester Output	•	•			
Size	2-1/2" x 5-1/5" x 11"	2-1/2" x 5-1/5" x 11"	2-1/2" x 5-1/5" x 11"	2-1/2" x 5-1/5" x 11"	2" x 4-1/2" x 9"
Volume	150 cu. in.	150 cu. in.	150 cu. in.	150 cu. in.	75 cu. in.
Weight	4 lb	4 lb	4 lb	4 lb	2.5 lb
PC Software for WINDOWS™ and PM 9080 Cable	•	Optional	Optional		Optional
Hard Carrying Case	•	Optional	Optional	Optional	Optional



New Product: This symbol represents the industry's latest offerings.



## Selection Guide for FLUKE Hand-Held DMMs

Basic Features	45	Series 10			70 Series III						20 Series						8060A	8062A	80 Series III		
		10	11	12	70	73	75	76	77	79	21	23	25	26	27	29			83	85	87
2 Ranges: 30,000 and 100,000 Counts	•																•	•			
20,000 Counts																					
Selectable 20,000 Counts																					•
4,000 Counts		•	•	•				•		•					•				•	•	•
3,200 Counts						•	•	•			•	•	•		•						
Auto and Manual Ranging		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
Selectable 40,000 Counts																					
<b>Special Features</b>																					
Analog Bar Graph					•	•	•	•	•	•	•	•	•	•	•	•			•	•	
Analog Pointer																					•
Frequency Measurement	•							•		•					•		•		•	•	•
Duty Cycle																			•	•	•
dB, dBm Readout																	•				
Offset/Relative Reference	•																•	•	•	•	•
Temperature																					
Low-Ohms Zero Calibration (subtracts test-lead resistance)	•							•		•						•					
Continuity and Beeper	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Continuity Capture Mode	•			•																	
Automatic TOUCHHOLD®	•				•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
Min./Max. Hold	•			•															•	•	•
Average to 36 h																			•	•	•
Peak Min./Max.	•																				
Logic Test																					
Sealed Case, Water/Chemical Resistant														•		•					•
Splash and Dust Proof	•																		•	•	•
Fused 10-A Range						•	•	•	•	•	•	•	•	•	•	•			•	•	•
Capacitance				•	•				•		•						•		•	•	•
True-RMS (AC Volts)	•							•		•						•	•		•		
Diode Test	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
RS-232 Interface	•																				
Conductance													•		•		•		•	•	•
Backlit Display																			•	•	•
Premium Electrician's Test-Lead Set											•	•		•							
<b>Functions</b>																					
<b>DC Volts</b>		(Max. DC voltage without a probe is 1,000 V on all DMMs, except the Series 10 and 76, they are 600 V)																			
Basic Accuracy, %	.02	1.5	.9	.9	.5	.4	.4	.3	.3	.3	.4	.3	0.1	0.3	0.1	.3	.04	.05	.3	0.1	0.1
Maximum Resolution, $\mu$ V	1	1 k	1 k	1 k	100	100	100	10	100	10	100	100	100	0.01	100	10	10	10	100	100	10
<b>AC Volts</b>																					
Max. AC Voltage without Probe (RMS)	750	600	600	600	750	750	750	600	750	750	750	750	1000	1000	1000	750	750	750	1000	1000	1000
Basic Accuracy, %	.5	2.9	1.9	1.9	2.0	2.0	2.0	1.5	2.0	1.0	2.0	2.0	.5	1.5	.5	1.0	.2	.5	1.0	.5	.7
Maximum Resolution, $\mu$ V	100 k	1 k	1 k	1 k	1 k	1 k	1 k	1 k	1 k	100	1 k	1 k	100	0.1	100	100	10	10	100	100	10
Frequency Range, Hz	100 k	400	400	400	1 k	1 k	1 k	1 k	1 k	1 k	1 k	1 k	30 k	1 k	30 k	1 k	100 k	30 k	5 k	20 k	20 k
<b>AC and DC Amps.</b>																					
Maximum Resolution, $\mu$ A	100					10 k	10	1.0	10	1.0	10	10	.1	1	.1	1.0	.01	.01	0.1	0.1	0.1
Maximum Amps. without Probe (RMS)	10 A					10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	10 A	2 A	2 A	10 A	10 A	10 A
<b>OHMS</b>																					
Maximum Resolution, M $\Omega$	1	100	100	100	100	100	100	10	100	10	100	100	100	0.01	100	10	10	10	100	100	10
Maximum Resistance, M $\Omega$	300	40	40	40	32	32	32	40	32	40	32	32	32	40	32	40	300	300	40	40	40
Lifetime Warranty					•	•	•		•	•	•	•		•							

## From the bench

### DIGITAL MULTIMETERS

Courtesy of FLUKE

### Resolution, Digits, and Counts

Resolution refers to how small or fine a measurement a digital multimeter (DMM) can make. By knowing the resolution you can determine

whether the DMM can measure down to 1 V or down to 1 mV.

You wouldn't buy a ruler marked in 1-inch or 1-centimeter increments if you had to measure down to 1/4 of an inch or down to 1 millimeter. A thermometer that can only measure in whole degrees is not much use to you when your normal temperature reading is 98.6 °F. For that you need a thermometer with a .1 °F resolution.

The terms "digits" and "counts" are used to describe a meter's resolution. DMMs are grouped

by the number of counts or digits they can display. A 3-1/2-digit meter can display 3 full digits ranging from 0 to 9, and 1/2 digit which displays only a 1 or is left blank. A 3-1/2-digit meter displays up to 1,999 counts of resolution. A 4-1/2-digit meter displays up to 19,999 counts. It is more precise to describe a meter by counts of resolution than 3-1/2 or 4-1/2 digits. Today's 3-1/2-digit meters may have an enhanced resolution of up to 3,200 or 4,000 counts.

Meters with more counts offer better resolution

Continued



# Selection Guide for TEKTRONIX, B&K, and EXTECH Hand-Held DMMs

Basic Features	TEKTRONIX							B & K				EXTECH					
	150	157	TX1	TX3	912	914	916	390	389	388A	391	380282	383273	383274	381909	380285	380225
2 Ranges: 30,000 and 100,000 Counts																	
20,000 Counts																	
Selectable 20,000 Counts																	
4,000 Counts																	
3,200 Counts																	
2,000 Counts																	
Auto and Manual Ranging																	
40,000 Counts																	
50,000 Counts																	
Special Features																	
Analog Bar Graph																	
Analog Pointer																	
Frequency Measurement																	
Duty Cycle																	
dB, dBm Readout																	
Offset/Relative Reference																	
Temperature																	
Low-Ohms Zero Calibration (subtracts test-lead resistance)																	
Continuity and Beeper																	
Continuity Capture Mode																	
Automatic Touch Hold																	
Min./Max. Hold																	
Average to 36 h																	
Peak Hold																	
Logic Test																	
Sealed Case, Water/Chemical Resistant																	
Splash and Dust Resistant																	
Fused 10-A Range																	
Capacitance																	
True-RMS (AC Volts)																	
Diode Test																	
RS-232 Interface																	
Conductance																	
Hold Button																	
Functions																	
DC Volts (Max. DC voltage)	600	600	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	500	1000	600
Basic Accuracy, %	0.7	0.5	0.07	0.05	0.2	0.1	0.06	0.1	0.25	0.5	0.05	0.06	0.5	0.5	0.8	0.1	0.25
Maximum Resolution, $\mu\text{V}/\text{mV}$	100 $\mu\text{V}$	100 $\mu\text{V}$	10 $\mu\text{V}$	10 $\mu\text{V}$	10 $\mu\text{V}$	10 $\mu\text{V}$	10 $\mu\text{V}$	100 $\mu\text{V}$	100 $\mu\text{V}$	100 $\mu\text{V}$	10 $\mu\text{V}$	1 $\mu\text{V}$	0.1mV	0.1mV	0.1mV	10 $\mu\text{V}$	0.1mV
AC Volts																	
Max. AC Voltage without Probe (RMS)	600	600	1000	1000	750	750	750	750	750	750	750	750	750	750	500	750	600
Basic Accuracy, %	0.7	0.5	0.6	0.4	1	0.8	0.7		0.8	1.2	1.0	0.7	0.5	0.5	1	0.5	2
Maximum Resolution, $\mu\text{V}$	1mV	1mV	10 $\mu\text{V}$	100 $\mu\text{V}$	1mV	100 $\mu\text{V}$	100 $\mu\text{V}$	100 $\mu\text{V}$	100 $\mu\text{V}$	100 $\mu\text{V}$	10 $\mu\text{V}$	10 $\mu\text{V}$	0.1mV	0.1mV	1mV	10 $\mu\text{V}$	1mV
Frequency Range, Hz			5-1MHz	5-1MHz	1K	10 $\mu\text{V}$	20K	50-1000	50-1000	50-500	50-2000	10M	20M	20M	3M	200K	
AC and DC Amps.																	
Maximum Resolution, $\mu\text{A}/\text{mA}$		1 $\mu\text{A}$	10nA	10nA	.1 $\mu\text{A}$	.1 $\mu\text{A}$	.1 $\mu\text{A}$	1.0	1.0	0.1	0.01	10nA	.1	.1	.1/1	.1/01	.1
Maximum Amps. without Probe (RMS)		10A	10mA	10mA	20mA	20mA	20mA	20	20	20	20	10	20	20	300mA	10	10
OHMS																	
Maximum Resolution, $\text{k}\Omega/\text{M}\Omega$	10 $\text{k}\Omega$	0.1 $\Omega$	0.01 $\Omega$	0.01 $\Omega$	0.01 $\Omega$	0.01 $\Omega$	0.01 $\Omega$	100M $\Omega$	100M $\Omega$	10M $\Omega$	10M $\Omega$	0.1M $\Omega$	0.1 $\Omega$	0.1 $\Omega$	0.1 $\Omega$	0.1 $\Omega$	0.1 $\Omega$
Maximum Resistance, $\text{M}\Omega$	30	20	50	50	30	40	40	40	40	40	20	40	20	20	30	20	30

for certain measurements. For example, a 1,999-count meter cannot measure down to 1/10 of a volt if you are measuring 200 V or more. However, a 3,200-count meter can display 1/10 of a volt up to 320 V. This is the same resolution as a more expensive 20,000-count meter until you exceed 320 V.

## Accuracy

Accuracy is the largest allowable error that can occur under specific operating conditions. In

other words, it is an indication of how close the DMM's displayed measurement is to the actual value of the signal being measured.

Accuracy for a DMM is usually expressed as a percent-of-reading. An accuracy of  $\pm 1\%$  of reading means that for a displayed reading of 100.0 V, the actual value of the voltage could be anywhere between 99.0 V to 101.0 V.

Specifications may also include a range of digits added to the basic accuracy specification. This indicates how many counts the digit to the

extreme right of the display may vary. So the accuracy example from above might be stated as  $\pm(1\%+2)$ . Therefore, for a display reading of 100.0 V the actual voltage is between 98.8 V and 101.2 V.

Analog-meter specifications are determined by the error at full scale, not at the displayed reading. Typical accuracy for an analog meter is  $\pm 2\%$  or  $\pm 3\%$  of full scale. Typical basic accuracy for a digital multimeter  $\pm(0.7\%+1)$  to  $\pm(0.1\%+1)$  of reading, or better.



# Introducing the FLUKE 80 Series III analog digital multimeters



The FLUKE 80 Series meters are the most popular in their class. The new 80 Series III meters offer state-of-the-art technology, outstanding features,

and high accuracy. Each meter includes a 9-V battery, test leads, alligator clips, protective holster, and multilingual manual.

**BRIGHTER  
DISPLAY**

## New Series III Features

- IEC-1010-1 CATIII, 1,000-V input protection, and enhanced EMI shielding • True-RMS measurements (85, 87) • Brighter backlit display with 20%-larger digits

## Model 87-III Features

- 250- $\mu$ s peak min./max. • 4-1/2-digit/19,999-count display • 0.05% basic DC accuracy

## Features on All Models

- 3-3/4-digit/4,000-count display • TOUCH HOLD and relative modes • Auto-ranging • Rugged, high-performance meters for wide-ranging applications • AC- and DC-voltage measurements up to 1,000 V • All inputs protected to 1,000 V AC and DC • AC- and DC-current measurements up to 10 A, and 40-mA range within 0.01-mA resolution • Frequency measurements up to 200 kHz • Capacitance measurements up to 5  $\mu$ F • Conductance test up to 40 ns • Min./max./average recording modes with MIN/MAX ALERT™ • INPUT ALERT™ and overload protection • For complete specifications, see chart on page 10 • Lifetime warranty



For complete specifications, see chart on page 10.

P/N	Description	1-3	4-9	10+
83-III	Series III analog/digital multimeter	\$279.00	\$264.00	\$250.00
85-III	Series III analog/digital multimeter	319.00	302.00	286.00
87-III	Series III analog/digital multimeter	349.00	330.00	315.00

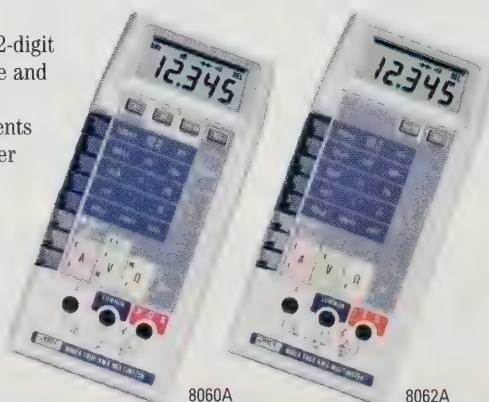
## FLUKE 8060A/8062A 4-1/2-Digital Hand-Held DMMs

These DMMs offer more measurement capabilities than many bench/portable models. They are well-suited for engineers and technicians working in audio, video, telecommunications, or computer technology. Both meters combine precision and accuracy with a wealth of features to fit nearly every application.

- .050% accuracy • 4-1/2-digit LCD • True-RMS voltage and current measurement • Resistance measurements to 300 ohms • Low power ohms on all resistance ranges • Relative reference (offset) • Diode test function • Audible and visual continuity indicator • Frequency and dB measure-

ments (8060A only) • Several annunciator symbols in the display remind the user which measurement function is selected • UL 1244 Listed • 1-year warranty

Each model includes TL70A Test Leads, 9-V battery (installed), spare fuse, and operator's manual.



## FLUKE Series 10 Multimeters

The compact design of these meters includes a slide-switch and push-button controls for true one-hand operation. Each model includes safety-designed TL75 Test Leads, 9-V battery (installed), and operator's manual.

- 3-3/4-digit DMMs • 4,000-count display • AC/DC voltage to 600 V • Ohms and diode test • Auto- or manual-ranging • Sleep-mode • V CHECK™ and capacitance (Models 11 and 12 only) • Min., max. record and continuity capture (Model 12 only) • 2-year warranty • UL Listed



P/N	Description	1-3	4-9	10+
8060A	4-1/2 DMM frequency and dB measurements	\$479.00	\$461.00	\$438.00
8062A	4-1/2 DMM	389.00	373.00	354.00

P/N	Description	1-3	4-9	10+
10	Multimeter	\$74.00	\$70.95	\$67.60
11	Multimeter with V Check	84.00	80.75	76.75
12	Multimeter with V Check/min./max.	99.00	95.00	90.50



Rough handling and high voltage take their toll on meters, but the new FLUKE 70 Series III and 20 Series III multi-meters take them in stride.



FLUKE 70 Series III/20 Series III Digital Multimeters

They are built tough inside and out, with overvoltage protection to guard against surges and the IEC 1010-1 safety rating to prove it. They are even protected against accidentally measuring voltage with the knob set on ohms. The rugged over-molded plastic case offers constant protection, no matter how much you throw it around.

As tough as they are, the 70 Series III and 20 Series III multimeters are very easy on you. The tapered design fits more easily into your hand, pocket, and tool box. The large screen and extra large characters are easy to read from a distance. Plus, there is easier access to FLUKE's patented TOUCH HOLD mode which automatically captures a measurement, beeps, and locks it on the digital display for later viewing.

No matter how tough your jobs are, the 70 Series III and 20 Series III multimeters are even tougher. And of course, they're backed by a lifetime warranty.

- Continuity beeper • Diode test • Analog bar graph • Automatic TOUCH HOLD • True-RMS (Model 79 only) • Premium electrician's test-lead set included with 20 Series meters—consisting of extralong silicone test leads, removable test probes, and 1 black alligator clip to make convenient ground connections

P/N	Description	1-3	4-9	10+
70-III	Digital multimeter	\$109.00	\$102.40	\$96.00
73-III	Digital multimeter	135.00	126.40	118.00
75-III	Digital multimeter	165.00	154.00	145.00
77-III	Digital multimeter	185.00	178.00	171.00
79-III	True-RMS digital multimeter	209.00	196.00	184.00
21-III	Digital multimeter with premium test-lead set	185.00	178.00	171.00
23-III	Digital multimeter with premium test-lead set	205.00	192.00	180.00
26-III	True-RMS digital multimeter with premium test-lead set	229.00	215.00	201.00



40% Brighter Display, New Ergonomic Design



Specifications	Model 70/73	Model 21/75	Model 23/77	Model 26/79
Display Counts	3,200	3,200	3,200	4,000
IEC 1010 Rating	600 V CATII	600 V CATII	600 V CATII and 1,000 V CATII	600 V CATII and 1,000 V CATII
DC Volts				
Maximum Voltage	600 V	600 V	1,000 V	1,000 V
Basic Accuracy	0.3%	0.3%	0.3%	0.3%
AC Volts				
Maximum Voltage	600 V	600 V	1,000 V	1,000 V
Basic Voltage	2%	2%	2%	1.5%
AC and DC Current				
Maximum Amps	10 A, Continuous (Model 73 Only)	10 A, Continuous	10 A, Continuous	10 A, Continuous
Resistance				
Maximum Resistance	32 MΩ	32 MΩ	32 MΩ	40 MΩ
Basic Accuracy	0.5%	0.5%	0.5%	0.4%



## TEKTRONIX DMM900 Innovative Series

The TEKTRONIX-designed DMM900 Series hand-held digital multimeters are 4-3/4-digit (40,000-count) true-RMS, and autoranging. They provide all the typical DMM measurements (AC/DC voltage, AC/DC current, frequency, resistance, continuity check, diode test, and capacitance) plus the following standard functions: analog bar-graph display, min./max./avg., hold, and auto hold.

- Dual numeric display shows additional information
- High/low limits



DMM914

allow the user to quickly repeat the same measurements (first it saves a high and low value, then it notifies the user with a beep if the present measurement is within those limits or not) • Measures the total of RMS value—including AC and DC components • Temperature can be measured in °F or °C with optional ATP01 bead probe and ATK01 thermo-couple adapter

Features	DMM916	DMM914	DMM912
Analog Bar-Graph Display	Yes	Yes	Yes
Time Stamp for Min./Max./Avg.	Yes	Yes	
Peak Hold (1 ms)	Yes		
dBm and dB Readings	Yes		
Safety	IEC,UL,CSA	IEC,UL,CSA	IEC,UL,CSA
Warranty	3 Years	3 Years	3 Years

Specifications	DMM916	DMM914	DMM912
Analog Bar-Graph Update Rate	20/s	20/s	20/s
DC Voltage	400 mV–1,000 V	400 mV–1,000 V	400 mV–1,000 V
Accuracy	0.06%	0.10%	0.20%
AC Voltage Ranges (RMS)	4 V–750 V	4 V–750 V	4 V–750 V
Accuracy	0.70%	0.80%	1.00%
True-RMS Bandwidth	20 kHz	10 kHz	1 kHz
DC Current Ranges	4,000 $\mu$ A–10 A	4,000 $\mu$ A–10 A	4,000 $\mu$ A–10 A
Accuracy	0.30%	0.40%	0.50%

P/N	Description	1-3	4-9	10+
DMM912	Model DMM912	\$199.00	\$189.00	\$181.00
DMM914	Model DMM914	249.00	238.00	229.00
DMM916	Model DMM916	289.00	276.00	265.00
P/N	Description	Each		
A605	500-A-AC current probe	\$90.00		
ATLDX1	Deluxe lead set with tip accessories	69.00		
ATL21	Shielded banana-plug leads	17.00		
AC12	Large, soft nylon case	37.00		
ATP01	K-type bead probe for temperature measurements	12.00		
ATK01	Adapter (thermocouple to banana plug)	14.00		
ATL01	Replacement leads	9.00		

**Tektronix**

## TEKTRONIX TEK-DMM™ Hand-Held Digital Multimeters

Whether you work in the field or at a bench, you can get TEKTRONIX performance and reliability in a DMM that's right for you. Get accuracy to 0.1% and features like autoranging, continuity check/beeper, data hold, over-range indication, and rugged design.



CMM150

DMM150



DMM157

P/N	Description	1-3	4-9	10+
DMM150	3,200-count pen meter	\$69.00	\$65.00	\$60.00
CMM150	300-A clamp-probe attachment for DMM150	45.00	42.00	37.00
DMM157	2,000-count meter, 2 $\mu$ F–200 $\mu$ F	99.00	94.25	88.00

Specifications	DMM150	DMM157
Display Range	3,200	2,000
Basic DC Voltage Accuracy	0.7%	0.5%
AC Voltage Ranges	3 V–600 V	2 V–600 V
DC Voltage Ranges	300 mV–600 V	200 mV–600 V
DC Current Ranges		2 mA–10 A
AC Current Ranges	300 A with CMM 150	2 mA–10 A
Resistance Ranges	300 $\Omega$ –30 M $\Omega$	200 $\Omega$ –20 M $\Omega$
Autoranging	Yes	Yes
Capacitance Ranges		2 $\mu$ F–200 $\mu$ F

## TEKTRONIX TX Series Multimeters

You don't need to sacrifice ruggedness, safety, and quality to enjoy the accuracy and features needed in today's changing maintenance environment. The TEKTRONIX TX-DMM™ True-RMS multimeters feature extralarge, dual numeric displays that provide more information in fewer steps and can be viewed from across a room.

WSTRM is the complete solution for data transfer and analysis from the TX-DMM multimeters to PCs. The WSTRM features WaveStar software for meters and includes an interface cable.

- 1,000-V CAT III (IECC 61010 compliant) input-voltage safety rating
- Built-in K-type digital thermometer (TX3 only)
- Setup menu for custom user defaults
- Auto and manual hold and ranging
- Min./max./avg./max.-min. recording with time stamp
- dBm and dB (TX3 only)
- Traceable calibration certificate included
- Easy battery access without breaking calibration seal



TX1

TX3

Specifications	Range
Display	50,000 and 5,000 (selectable)
DC/AC Voltage Ranges	500.0 mV, 5,000 V, 50.0 V, 500.0 V, 1,000 V CAT III
DC/AC Current Ranges	500.0 $\mu$ A, 5,000 mA, 50.0 mA, 500.0 mA, 10.0 A (3 minutes)
Resistance Ranges	50.0 $\Omega$ , 5,000 k $\Omega$ , 50.0 k $\Omega$ , 500.0 k $\Omega$ , 5,000 M $\Omega$ , 50.0 M $\Omega$
Capacitance Ranges	5,000 nF, 50.0 nF, 500.0 nF, 5,000 $\mu$ F, 50.0 $\mu$ F, 500.0 $\mu$ F, 5,000 mF, 50.0 mF
Frequency Range	0.5 Hz–1 MHz

P/N	Description	1-3	4-9	10+
TX1	Meter with test leads	\$275.00	\$266.00	\$253.00
TX3	Meter with test leads and thermocouple-to-plug adapter	325.00	314.00	299.00
WSTRM	PC-interface package	149.00	—	—



B&K 3-3/4-Digit and 4-1/2-Digit Test-Bench Multimeters



- Model 391:** • True RMS reading • Accuracy: .050% V DC • Measures voltage to 1,000 V DC; 750 V AC to 20 A DC and AC; and to 20 MΩ • Frequency measurement • Data-hold • Drop-resistant case • Logic-probe function • Duty-cycle measurement
- Model 390:** • Accuracy: .1% V DC • Analog bar graph • Auto/manual ranging • Capacitance measurement • Temperature probe • Relative mode • Min./max. • Memory • Audible continuity • Data-hold
- Model 389:** • Accuracy: .250% V DC • Analog bar graph • Auto/manual ranging • 4,000-count LCD • Capacitance measurement • Frequency measurement • Min./max. • Memory plus data-hold • 1,000-h battery life • Audible continuity • All current ranges fused • Water resistant
- Model 388A:** • Accuracy: 5% V DC • Resistance: .1 Ω–40 Ω • Capacitance measurement • Logic-probe function (TTL) • Transistor-gain measure (hFE) • Audible continuity

P/N	Description	1-9	10+
391	True-RMS DMM	\$179.00	\$171.25
390	DMM	159.00	152.25
389	DMM	139.00	133.00
388A	DMM	119.00	113.75

NOTE: Each unit comes with a 3-year warranty.

EXTECH Pocket Digital Multimeters

Choose the 3,200-count DMM (UL Listed) or 2,000-count economy model. The 3,200-count auto-ranging DMM provides more resolution, bar-graph display, function indication, and audible continuity beeper. The 2,000-count manual-ranging DMM features a larger display, 200-mA range, and continuity indication. Both models include a data-hold and diode test feature and come complete with a wallet-style case, test leads, 1.5-V batteries, and manual.

- DC/AC voltage to 450 V



P/N	Description	1-9	10+
380933	3,200-count	\$39.00	\$33.50
380929	2,000-count	25.00	21.50

EXTECH Dual-Display Pen DMM with Logic Test

Not just another pen multimeter, this one has a large display on both sides of the meter to enable a left- or right-handed user to see the reading. It measures AC/DC voltage and current plus frequency and it includes a logic probe.

- AC/DC voltage to 500 V • AC/DC amps to 300 mA, resistance to 3 MΩ, frequency to 3 MHz • Diode test • Continuity and logic • Data-hold • Auto- or manual-ranging • Includes batteries and leads



P/N	Description	1-9	10+
381909	Dual-display pen DMM	\$69.00	\$65.00

EXTECH Multimeter/Data-Acquisition Datalogging System

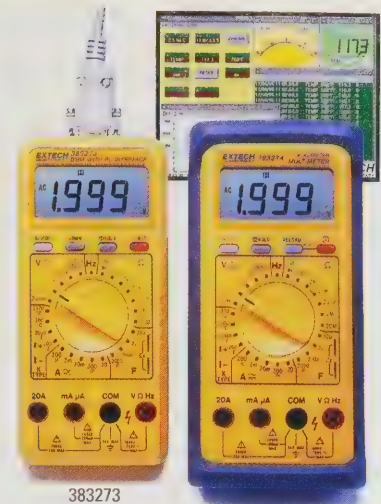
New Model 383274

This model has all the same features as the Model 383273 below, plus a built-in datalogger that can store 4,048 readings. It includes software to configure the multimeter for sampling times and to transfer stored data to a PC.

Model 383273

This unique multimeter features an RS-232 interface plus WINDOWS®-based data-acquisition software to monitor multimeter measurements on a PC.

- Monitor and store readings of AC/DC current/voltage, frequency, capacitance, resistance, and temperature • 3-1/2-digit LCD with data-hold and overload-warning • Built-in RS-232 interface with optical isolation to prevent damage to computer • WINDOWS®-based data-acquisition software allows user to capture and display readings directly to a PC • Set up timing sequences (0.5 to 32,767 s) to automatically collect data • PC displays digital, analog, graphic, and data listing • System includes multimeter with stand, Type-K temperature probe, test leads, data-acquisition software, RS-232 serial cable, and 9-V battery



P/N	Description	1-9	10+
383273	Multimeter / data-acquisition system	\$199.00	\$190.00
383274	Datalogger multimeter / data-acquisition system	399.00	342.00

EXTECH 4-1/2-Digit True-RMS Multimeter

This programmable DMM offers additional functionality with frequency, capacitance, and temperature measurements and a 3-year warranty.

EXTECH Heavy-Duty Autoranging DMM

- Large 3,200-count LCD • 0.25%-V-DC accuracy • 34-segment analog bar graph • Measures AC/DC voltage to 600 V • AC/DC current to 10 A • Drop-proof to 4 ft • Audible continuity and diode test • Input warning beeper • Fused current inputs with overload protection on all ranges • Meets UL 1244 Standards and IEC-10101 Standards • Complete with test leads, 9-V battery, and rubber holster with built-in stand



P/N	Description	1-9	10+
380285	4-1/2-digit true-RMS multimeter	\$199.00	\$190.00
380225	Heavy-duty autoranging DMM	79.00	67.00
380225-N	NIST Certificate for 380225	70.00	—



## A precision DC-mA, voltage, and frequency calibrator combined with a true-RMS multimeter

### EXTECH PROCESS CALIBRATOR MULTIMETER™

#### General Features

- True-RMS measurement for nonlinear voltage and current loads
- Built-in isolated RS-232 interface for data acquisition and documentation with optional WINDOWS® data-acquisition software
- Large 4,000/40,000-count backlit LCD shows primary, secondary, source/measure ranges, and functions selected
- Separate input/output banana jacks with fused protection
- Auto power-off with disable function

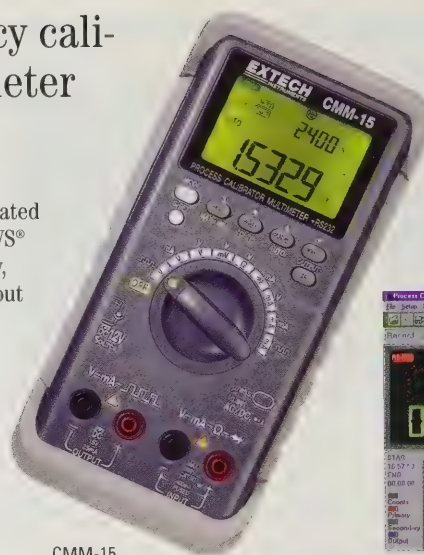
**Includes:** • Test leads • Temperature probe • 9-V battery • External battery pack • Protective holster • Rugged nylon case

#### Calibrator Features

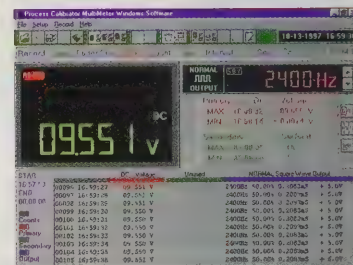
- Simultaneous source and measure on large dual display
- Precision constant voltage and current calibration source with 0.03% accuracy
- Constant current output for loads up to 500  $\Omega$
- Bipolar current ( $\pm 25$  mA) and voltage ( $\pm 1.5$  V,  $\pm 15$  V) outputs
- Wide range frequency (square wave) source with adjustable amplitude, pulse width, and duty cycle
- Programmable 16-step memory for continuous, scan, or cycle output
- Programmable 999-step ramp

#### DMM Features

- Measures DC mA, AC mA, DC V, AC V, AC+DC, temperature, frequency, duty cycle, pulse width, resistance, continuity, and diode
- 1- $\mu$ V or 1- $\mu$ A resolution with 0.03% basic DC-V accuracy
- 1-ms peak hold for glitch capture, data hold, min./max. reading, and relative functions



CMM-15

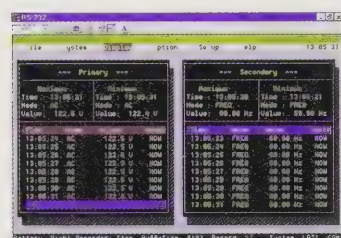


WINDOWS Software

P/N	Description	1-9	10+
CMM-15	CMM-15 PROCESS CALIBRATOR MULTIMETER	\$499.00	\$467.00
CMM-15-N	Certificate of traceability to NIST	70.00	—
423235	RS-232 cable and software diskette	69.00	—
149116	Optional 117-V-AC adapter from 12-V-DC source	15.00	—

## EXTECH 4-1/2-Digit True-RMS DMM

- Has all basic DMM functions plus true-RMS, AC+DC, duty cycle, dBm, conductance, time stamp, frequency, and temperature
- 1- $\mu$ V or 10-nA resolution with 0.06% basic DC-V accuracy
- Large 4,000/40,000-count LCD shows primary, secondary, bar graph, range, and function
- 45 Hz–20 Hz AC-V frequency response
- Dual display of V/A/dBm with frequency or V
- Record min./max. and true average with relative time stamp for these functions
- Display dB with 20 selectable reference impedances
- Auto power-off and sleep modes



WINDOWS Software



380282



## EXTECH Watt Meter/DMM

Use this meter to monitor and evaluate power losses from single-phase transformers and electrical equipment, or use its multimeter functions to measure AC and DC voltage and current.

- 0.5" LCD is easy to read
- Built-in fold-out stand
- Comes complete with 9-V battery and set of test leads



380660



Specifications	Range	Resolution	Accuracy (% Rdg. + Digits)
Watts	0 W–2,000 W, 6,000 W	1 W, 10 W	$\pm(1\% \text{ rdg.} + 1 \text{ dgt.})$
AC Voltage (45 Hz–60 Hz)	0 V–200 V, 750 V	0.1 V, 1 V	$\pm(0.8\% \text{ rdg.} + 1 \text{ dgt.})$
DC Voltage	0 V–200 V, 1,000 V	0.1 V, 1 V	$\pm(0.8\% \text{ rdg.} + 1 \text{ dgt.})$
AC/DC Current	10 A	10 mA	$\pm(1\% \text{ rdg.} + 1 \text{ dgt.})$
Input Voltage/Current	0 AC V–600 AC V/1 AC A–10 AC A	—	—
Overload Protection	1,000 AC V or 1,100 DC V	—	—
Input Impedance	1 M $\Omega$	—	—

P/N	Description	1-9	10+
380282	Dual-display true-RMS multimeter	\$299.00	\$280.00
380282-N	Certificate of traceability to NIST	70.00	—
380283	RS-232 interface, cable, software diskette	29.00	—
409997	Vinyl carrying pouch	19.00	—

P/N	Description	1-9	10+
380660	Watt meter/multimeter	\$199.00	\$170.00
380660-N	Certificate of traceability to NIST for 380660	70.00	—
380965	Spare test leads	10.00	—
409996	Carrying pouch	15.00	—



## FLUKE 36 Clamp Meter

The FLUKE 36's functions include: 2 ranges of DC current (200 A and 1,000 A), 2 ranges of AC current (200 A and 600 A), 2 ranges of AC or DC voltage (200 V and 600 V), and 1 range of resistance (200  $\Omega$ ). The resistance range also functions as a continuity test by sounding an audible tone when the resistance being measured is less than 50  $\Omega$ . Switching between ranges is manual.

Included with the meter are:

- Test leads (TL75) • 9-V battery (installed) • User's manual • Soft vinyl protective carrying case • 1-year warranty



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## FLUKE Models 31 and 33 CURRENT MASTERS™

The Models 31 and 33 combine true-RMS AC current measurements with rugged, reliable performance for trouble shooting traditional and nonlinear load problems.

- True-RMS AC current measurement (0.3 A-700 A)
- Digital/analog display • Frequency measurement (0.5 Hz-10 kHz) • Display hold • Auto and manual ranging • Beeper for audible feedback • Min./max. record (33) • SMOOTHING™ (33) • UL Listed
- 1-year warranty



33

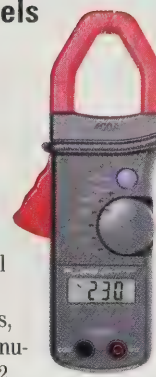


31

## FLUKE Models 30 and 32 Clamp Meters

These clamp meters offer precision quality at a low price. The Model 30 measures AC current, AC volts, ohms, and continuity. The Model 32 adds true-RMS, AC current to 600 A, and a crest factor of 2.

- Manual ranging • Display hold captures readings in difficult-to-reach areas • 3-1/2-digit, 2,000-count digital display • Measures AC voltage to 600 V, resistance to 200  $\Omega$ , and continuity
- Average AC responding measurements (Model 30) • Includes: TL75 HARD POINT™ test leads • UL Listed • 1-year warranty



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32

P/N	Description	1-9	10+
36	Clamp meter	\$224.00	\$214.00

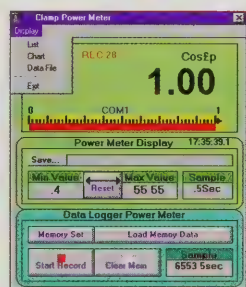
P/N	Description	1-9	10+
31	CURRENT MASTERS clamp meter	\$239.00	\$229.95
33	CURRENT MASTERS clamp meter with min./max record	279.00	268.00

P/N	Description	1-9	10+
30	Average-sensing clamp meter	\$109.00	\$104.50
32	True-RMS clamp meter	155.00	148.00

# FLUKE®

## EXTECH Clamp-On Power DATALOGGER

- Displays true-RMS, volts, amps, watts, min./max., and average • Displays phase angle in degrees and cosine with inductive or capacitance indication
- Measures current, voltage, resistance, continuity, and frequency • Clamp jaws open to 1.8" • Built-in recorder stores up to 1,600 readings • Large 4-digit 2" LCD with bar graph and peak hold • Complete with 9-V battery, alligator clips, test leads, and case



WINDOWS Software



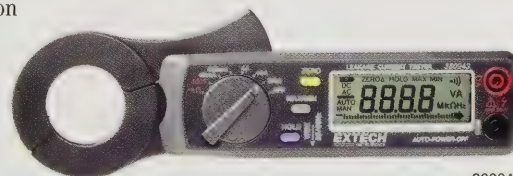
382060

Specifications Display Mode	Range	Accuracy	Resolution	Overload Protection
True Power	1,000 kW	$\pm(2\% \text{ rdg. } +5 \text{ dgts.})$	100 W	1,100 A/1,100 V
Apparent Power	1,000 kVA	$\pm(2\% \text{ rdg. } +5 \text{ dgts.})$	100 VA	1,100 A/1,100 V
Power Factor	0.3-1	$\pm(1\% \text{ rdg. } +3 \text{ dgts.})$	0.01	1,100 A/1,100 V
Peak Current	1,000 A	$\pm(2.5\% \text{ rdg. } +10 \text{ dgts.})$	0.1 A	1,100 A
AC Current (40 Hz-400 Hz)	1,000 A	$\pm(2\% \text{ rdg. } +10 \text{ dgts.})$	0.1 A	1,100 A
DC Current	1,000 A	$\pm(2\% \text{ rdg. } +5 \text{ dgts.})$	0.1 A	1,100 A
AC Voltage (40 Hz-400 Hz)	750 V	$\pm(1.2\% \text{ rdg. } +10 \text{ dgts.})$	100 mV	1,100 V
DC Voltage	1,000 V	$\pm(0.75\% \text{ rdg. } +2 \text{ dgts.})$	100 mV	1,100 V

P/N	Description	1-9	10+
382060	Clamp-on power DATALOGGER	\$599.00	\$514.00
382061	3-phase adapter	79.00	—
382062	Plug-in RS-232 interface, cable, software	79.00	—
480172	AC line separator, 3-prong	15.00	—

## EXTECH AC-Leakage Current Tester

- 4,000-count display provides 10- $\mu$ A resolution • Specially designed selectable 50 Hz/60 Hz filter circuit eliminates high-frequency noise and harmonics • Overload protection on most ranges • Min./max., data hold, low battery, and function indication
- Continuity beeper and "zero" for relative measurements

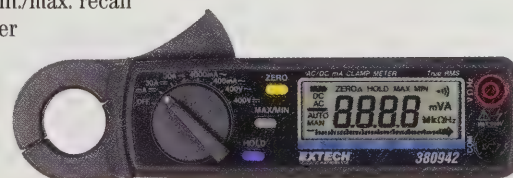


380943

P/N	Description	1-9	10+
380943	AC-leakage current tester	\$299.00	\$280.00
380943-N	NIST certificate of traceability	70.00	—
480172	AC line separator, 3-prong	15.00	—

## EXTECH 30-A True-RMS AC/DC DMM

- Mini clamp meter • True-RMS AC current and voltage • Measures low current with high resolution to 0.1 mA AC or 1 mA DC • Large 4,000-count LCD with full function indication • Fast 40-segment analog bar graph • 1-touch "auto zero" for DCA measurements eliminates the need to turn a knob to zero adjust • Data hold, min./max. recall display, and auto power off • 0.9" clamp-jaw opening • Complete with case, test leads, wrist strap, and 2 AA batteries



380942

P/N	Description	1-9	10+
380942	True-RMS 30-A mini clamp meter	\$359.00	\$337.00
380942-N	Certificate of traceability to NIST	70.00	—
480172	AC line separator, 3-prong	15.00	—



## FLUKE T5-600 and T5-1000 Electrical Testers

Type-T5 multimeters provide a variety of measurements in each compact test unit. Leads are attached to the units with integral strain reliefs. The units measure up to 100-V AC current and 1,000-Ω resistance. Type T5-600 measures AC or DC voltage to 1,000 V.

- Basic DC V accuracy:  $\pm(1.0\% + 1 \text{ digit})$  for both units
- 2 AA batteries and instruction sheet included
- Measure AC or DC voltage, AC current, resistance, and continuity with 1 unit
- Voltage indicator lights when more than 30 V AC or 60 V DC are present
- Display hold/automatic power-down/low-battery indicator
- 1-yr. warranty



P/N	Description	1-3	4-9	10+
T5-600	600 V AC or DC	\$89.95	\$84.65	\$79.95
T5-1000	1,000 V AC or DC	99.95	93.00	87.45

## FLUKE T2 Electrical Tester

The T2 is a voltage and continuity tester that's designed to work long and hard. There are no settings—just probe the circuit and the T2 shows you whether you're looking at AC volts or an open circuit. You don't even have to turn it on or off. With 7 different voltage indicators, it can clearly differentiate between key voltage levels.

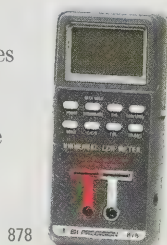
- LEDs clearly indicate 7 AC and 7 DC nominal voltage levels
- Indicates DC voltages as low as 6 V
- DC polarity indicator
- Automatically selects continuity beeper or voltage measurement
- Rugged enough to withstand a 10-ft drop
- Automatically activates and shuts down to conserve battery power



P/N	Description	1-3	4-9	10+
T2	Electrical tester	\$44.95	\$42.50	\$39.95

## B&K Component Tester

- Measures capacitance, resistance, and inductance
- Measures dissipation factor of capacitors and  $\Omega$  of inductors
- Relative mode
- Audible tolerance-mode outside: 1%, 5%, or 10%
- 2 test frequencies (120 Hz, 1 kHz)



P/N	Description	1-3	4-9	10+
878	Universal LCR meter	\$275.00	\$264.00	\$249.00

## FLUKE 7 Series Electrical Testers

The economical 7 Series offers first-level electrical trouble-shooting combined with a compact design and slide switch for single-handed operation.

These testers also have an "auto-selection" feature that simplifies voltage measurements in power environments. When measuring ohms/continuity with more than 4.5 V present across the input jacks (international or not) the meter automatically switches to measuring AC V or DC V, whichever is greater. Input impedance is approximately 2 kΩ, helping to determine if voltage is from leakage (so-called "ghost" voltage) or a hard connection. Over-load protection is provided in all measurement modes.

- 4,000-count digital display
- Automatic readings of V AC (300 V [Model 7-300], 600 V [Model 7-600])
- Automatic readings of V DC (300 V [Model 7-300], 600 V [Model 7-600])
- 400-Ω range/continuity beeper
- TL75 test leads included
- UL Listed



P/N	Description	1-3	4-9	10+
7-300	300-V electrical tester	\$54.95	\$51.00	\$48.00
7-600	600-V electrical tester	69.95	65.00	61.00

## B&K LCR Meter

- 100-μH inductance range, 2-Ω resistance range, and 20-mF capacitance range
- Measures dissipation factors of capacitors and I/Q of inductors
- 3-1/2-digit LCD



P/N	Description	1-3	4-9	10+
875B	LCR meter	\$179.00	\$169.00	\$159.00
LC-29A	Carrying case	Each: 10.00		
BE-11	AC adapter	Each: 21.00		

## B&K Auto-Ranging Capacitance Meter

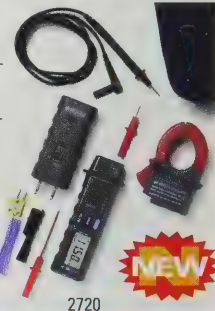
- 3-1/2-digit LCD
- Measures capacitance to 199.9 mF
- 10 ranges from 199.9 pF to 199.9 mF



P/N	Description	1-3	4-9	10+
830	Capacitance meter	\$339.00	\$325.00	\$312.00
LC-28	Carrying case	Each: 22.00		
BC-28	AC adapter/charger	Each: 23.00		

## B&K Hand-Held DMM and Current-Clamp Kit

This kit is ideal for troubleshooting most heating, ventilation, air-conditioning/ refrigeration systems as well as most circuit and temperature systems. The 2720 kit includes the 2710 DMM, CH-100 current head, and the TP-30B temperature adapter. The 2710 is a 3,200-count uniquely designed multimeter that measures V AC, V DC, resistance, and checks continuity and diodes. Its unique form factor allows the operator to probe with the DMM in 1 hand and the probe in the other.



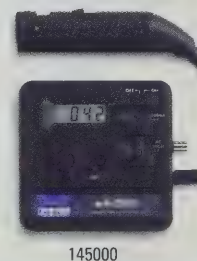
P/N	Description	1-3	4+
2720	DMM and current-clamp kit	\$165.00	\$156.00
2710	DMM	69.00	65.00
CH-100	Current head	35.00	—

## F. W. BELL™ Clamp-On Noncontact Milliammeter

The mA-2000 milliammeter allows for noncontact measurement of low-level AC and DC currents from 0 mA to 2,000 mA with resolution as low as 0.1 mA.

It is well-suited for research and development applications such as: verifying current drawn by specific devices, modules, or equipment; measuring battery charge and discharge currents; testing power-supply loads; and checking capacitor leakage.

The mA-2000 features true-RMS measurement with a frequency from DC to 100 kHz. A BNC analog output (1 mV/mA) allows for waveform analysis using an oscilloscope or recorder. With a DC basic accuracy of 1% of reading, the mA-2000 is a general low-current measuring instrument that is ideal for making measurements without circuit interruption.



P/N	Description	1-3	4-9	10+
145000	mA-2000 milliammeter	\$495.00	\$468.00	\$444.00

## FLUKE VOLTALERT™ 1AC Voltage Detector

This is a new, pocket-sized, AC line-voltage detector from FLUKE. It's easy to use—just touch the tip to an outlet or cord—when it glows red, you know there's voltage in the line.



- Operating range: 90 V AC-600 V AC
- Operating temperature: 14 °F to 122 °F (-10 °C to +50 °C)

P/N	Description	1-11	12-23	24+
1AC-A1	AC voltage detector	\$20.95	\$19.25	\$18.30



# Maximum versatility in a single instrument

## FLUKE 45 Dual-Display Bench/Portable Multimeter

With its 5-digit dual display and 100,000-count resolution, the FLUKE 45 allows the user to measure 2 different parameters of the same signal from 1 test connection, and view both measurements at the same time.

Includes line cord, TL70A Test Leads, operator's manual, and "quick reference" guide.

- Measurements to 1,000 V DC and 750 V AC, true RMS • DC and true-RMS current with separate 10-mA, 30-mA, 100-mA, and 10-A ranges • Resistance from 1  $\Omega$ –300 M $\Omega$  • Multi-function vacuum fluorescent dual display • True RMS voltage and current, including AC+DC • RS232 interface standard, IEEE-488.2 optional • Frequency measurement to 1 MHz • dB measurements with selectable reference impedance of 2 $\Omega$  to 8,000 $\Omega$  and audio power from 2 $\Omega$ –16 $\Omega$  • Compare function (high/low/pass) for quick intolerance tests • .050% DC-current accuracy for 4 mA–20 mA, current-loop service • TOUCH-HOLD, relative, and min./max. • Audible continuity and diode test • Closed-case calibration • 1-year warranty

Function	Range	Best Accuracy (Medium Reading Rate)	Resolution
V DC	0 V–1,000 V	$\pm 0.025\% + 2$	1 $\mu$ V–0.01 V
V AC (True-RMS, AC Coupled) Freq. 20 Hz–100 kHz	15 mV–750 V	$\pm 0.2\% + 10$	1 $\mu$ V–0.01 V
dB Readout (600- $\Omega$ Ref.) (Ref. Z 2 $\Omega$ –8,000 $\Omega$ )	–34 to +60	$\pm 0.08$ dBm	0.01 dB–0.1 dB
A DC	0 mA–10 A	$\pm 0.05\% + 2$	1 $\mu$ A–10 mA
A AC (True-RMS, AC Coupled) Freq. 20 Hz–20 kHz	15 $\mu$ A–10 A	$\pm 0.5\% + 10$	1 $\mu$ A–10 mA
Resistance	0 $\Omega$ –100 M $\Omega$	$\pm 0.05\% + 2$	0.001 $\Omega$ –1 M $\Omega$
Frequency	5 Hz to >1 MHz	$\pm 0.05\% + 1$	.01 Hz–1 kHz



45

P/N	Description	Each
45	5-digit DMM	\$719.00
45-01	With battery	849.00
45-05	With IEEE-488.2 Interface	879.00

## 6-1/2-digit accuracy at a 5-1/2-digit price

### HEWLETT PACKARD HP 34401A Multimeter

For the price of a 5-1/2-digit DMM you can now get the top-quality 6-1/2-digit HP 34401A. And with just a touch of 1 or 2 buttons

you can get a wide array of functions from DC V to frequency to dB and dBm.

Advanced tests include limit checks that can drive a TTL output, min./max./avg. readouts, and DC V ratios.

- 3-year warranty



34401A

Range	Resolution: 6-1/2 Digits (or Freq. for AC Voltage)	Accuracy (1 Year): $\pm$ (% of Reading + % of Range)	
<b>DC Voltage</b>			<b>Input Resistance</b>
100 mV	100 nV	0.0050 + 0.0035	10 M $\Omega$ or >10 G $\Omega$
1 V	1 $\mu$ V	0.0040 + 0.0007	10 M $\Omega$ or >10 G $\Omega$
10 V	10 $\mu$ V	0.0035 + 0.0005	10 M $\Omega$ or >10 G $\Omega$
100 V	100 $\mu$ V	0.0045 + 0.0006	10 M $\Omega$
1,000 V	1 mV	0.0045 + 0.0010	10 M $\Omega$
<b>True-RMS AC Voltage</b>			
100 mV	3 Hz–5 Hz	1.00 + 0.04	
	5 Hz–10 Hz	0.35 + 0.04	
	10 Hz–20 kHz	0.06 + 0.04	
	20 kHz–50 kHz	0.12 + 0.04	
	50 kHz–100 kHz	0.60 + 0.08	
	100 kHz–300 kHz	4.00 + 0.50	
<b>Ranges: 1 V–750 V</b>	3 Hz–5 Hz	1.00 + 0.03	
	5 Hz–10 Hz	0.35 + 0.03	
	10 Hz–20 kHz	0.06 + 0.03	
	20 kHz–50 kHz	0.12 + 0.05	
	50 kHz–100 kHz	0.60 + 0.08	
	100 kHz–300 kHz	4.00 + 0.50	
<b>Resistance</b>			<b>Current Source</b>
100 $\Omega$	100 $\mu\Omega$	0.010 + 0.004	1 mA
1 k $\Omega$	1 m $\Omega$	0.010 + 0.001	1 mA
10 k $\Omega$	10 m $\Omega$	0.010 + 0.001	100 $\mu$ A
100 k $\Omega$	100 m $\Omega$	0.010 + 0.001	10 $\mu$ A
1 M $\Omega$	1 $\Omega$	0.010 + 0.001	5 $\mu$ A
10 M $\Omega$	10 $\Omega$	0.040 + 0.001	500 nA
100 M $\Omega$	100 $\Omega$	0.800 + 0.010	500 nA
<b>DC Current</b>		Ranges: 10 mA–3 A	
<b>AC Current</b>		Ranges: 1 A–3 A	
<b>Frequency and Period</b>		3 Hz (0.333 s) to 300 kHz (3.33 $\mu$ s)	
<b>Continuity</b>		1,000- $\Omega$ range, threshold variable from 1 $\Omega$ to 1 k $\Omega$	
<b>Diode Test</b>		1-V range, 1-mA test current	
<b>Math Functions</b>		Null, min./max./avg., dBm, dB, limit test	
<b>Other Features</b>		Automatic reading hold, 512 readings storage, DC V–DC V ratio	
<b>Max. Input</b>		DC V and AC V	1,000 V DC, 750 V RMS AC
		DC and AC current	3 A, from <250-V source, double fused
<b>Shock and Vibration</b>		Meets MIL-T-28800D, Type III, Class 5	

P/N	Description	Each
34401A	6-1/2-digit multimeter	\$995.00
<b>Accessories</b>		
34130A	Deluxe test-lead set	36.00
5063-1407	Rack-mount kit	77.50
34161A	Accessory pouch	40.00
34812A/ABA	BENCHLINK meter software	300.00



Products with this symbol cannot be shipped via air, due to restrictions.



We provide telephone technical assistance with your purchases.



We are a full-service distributor with a broad range of the best products.



## FLUKE Test Leads, Probes, and Clips

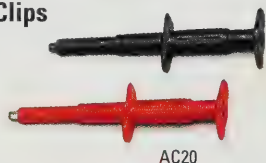
### TL22 Flexible Test Leads

Compatible with all DMMs/GMMs that accept safety-shrouded standard-diameter banana plugs.



#### Recommended Clips for TL22 Test Leads:

#### AC20 Industrial Test Clips



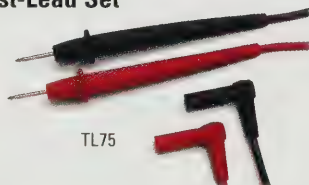
#### AC80 Hook-Style Test Clips



#### AC83 Pin-Grabber Test Clips



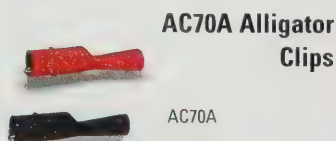
#### TL75 HARD POINT™ Test-Lead Set



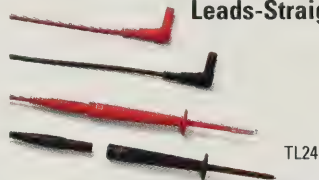
#### TL70A Right-Angle Test-Lead Set



#### Recommended Alligator Clips for Use with TL75 and TL70A:



### TL24 Flexible Test Leads-Straight



#### Recommended Clips for TL24 Test Leads:

#### AC75 Banana Jack with Alligator Clips



#### AC85A Large-Jaw Alligator Clips



#### AC89 Insulation-Piercing Clip



#### TP20 Industrial Test Probes



#### TP80 Electronic Test Probes



#### TL20 Industrial Test-Lead Set



### Y8134 Shrouded Test-Lead Kit

This kit includes the Y8132 test-lead set in a C75 case with the following interchangeable tips: AC75 alligator clips (2), spade lugs (2), black AC80 hook clip (1).

- Straight, safety-shrouded banana plugs • Y8132 test leads are UL 1244 listed



#### Y8133 Test-Lead Kit (Not Shown)

This is identical to the Y8134 except that the test-lead set has exposed banana plugs on one end.

#### Y8132 Detachable-Probe Test-Lead Set

These test leads have straight, shrouded banana plugs on both ends.



#### Y8131 Detachable-Probe Test-Lead Set (Not Shown)

The Y8131 is identical to the Y8132, except that the test-lead set has exposed banana plugs on one end.

#### Y8140A Slim-Flex Test-Lead Set



### FLUKE C789 Soft Case



### FLUKE C25 Soft Case



### FLUKE C50 Compact Soft Case



### FLUKE C10 Series 10 and C70Y Series II Holsters (Yellow)



P/N	Description	Each
TL22	Flexible test leads	\$18.00
AC20	Industrial test clips	22.00
AC80	Hook-style test clips	17.00
AC83	Pin-grabber test clips	22.00
TL24	Flexible test leads-straight	18.00
AC75	Banana-jack, alligator clips	9.00
AC85A	Large-jaw alligator clips	11.00
AC89	New insulation-piercing clip	22.00
TP20	Industrial-strength probes	9.00
TP80	Electronic test probes	20.00

P/N	Description	Each
TL20	Industrial test-lead set	\$43.00
TL75	HARD POINT™ test-lead set	10.00
TL70A	Right-angle test-lead set	11.00
AC70A	Alligator clips	7.00
Y8132	Detachable-probe test-lead set	15.00
Y8131	Detachable-probe test-lead set	15.00
Y8134	Shrouded test-lead set	37.00
Y8133	Test-lead kit	36.00
Y8140A	Slim-flex test-lead set	27.00

P/N	Description	Each
C25	Soft case for 25 or 27 or 80 Series in holster	\$22.00
C90	Soft case for 8060A and 8062A, also 21, 23, 29, 50, and 70 Series without holster	17.00
C50	Compact soft case for 21, 23, 29, 50, and 70 Series without holster	17.00
C789	Soft case for GMMs	80.00
C10	Series 10 holster (yellow)	10.00
C70Y	Holster (yellow) for all 70 Series and 21, 23, 29 meters	17.00



## FLUKE i410 and i1010 Current Clamps—Multimeter Accessories

These new-generation FLUKE AC/DC current clamps offer advances in performance, noise immunity, and durability. Both clamps can now measure AC or DC current down to 1 A with specified accuracy—and are usable to 0.5 A.



Features	i410	i1010
AC Current	400 A	600 A
DC Current	400 A	1,000 A
Accuracy	3.5%	2%
True-RMS	With True-RMS DMM	
DC Zero Adjust to Null Out Offset	•	•
On/Off LED Indicator	•	•
Shielded Heat-Resistant Silicon-Rubber Cable	•	•
Battery-Check Mode	•	•
Rugged Construction	•	•
CAT III-600 V	•	•

P/N	Description	Each
i410	Current clamp: 400-A DC, 400-A AC	\$154.00
i1010	Current clamp: 600-A DC, 1,000-A AC	254.00

## FLUKE 80K-40 High-Voltage Probe\*

This probe measures up to 40 kV DC or 28 kV RMS AC. The division ratio is 1,000 to 1. It has 1,000-M $\Omega$  input resistance. It is for use with an instrument having 10-M $\Omega$  input impedance. The DC accuracy is: 20 kV to 35 kV,  $\pm 1\%$  at 20  $^{\circ}$ C to 30  $^{\circ}$ C; add 1% at 10  $^{\circ}$ C to <20  $^{\circ}$ C and >30  $^{\circ}$ C to 45  $^{\circ}$ C. 0 kV to <20 kV and >35 kV to 40 kV:  $\pm 2\%$ . AC accuracy is 60 Hz, 5%.

**\*WARNING!** To avoid damage or electric shock, use high-voltage probes under dry conditions (no condensation) in low-energy applications, such as CRT supplies.



P/N	Description	Each
80K-40	High-voltage probe	\$119.00

## PROBE MASTER SOFTIE Test-Lead Kit

The new soft, comfortable hand grips conform to the shape of your hand and can be bent to more than 90 $^{\circ}$ . The kit includes: 2 soft-probe leads, 2 sprung hooks, 2 alligator clips, 2 tip covers, 2 spade lugs, and 1 pouch.

- Silicone leads, burn-resistant • Soft, comfortable hand grips • 48" (L), 18-ga test leads

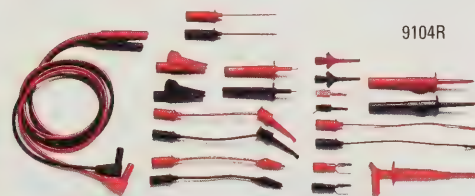


P/N	Description	Each
2025S	Kit, 90 $^{\circ}$ banana plug	\$21.90
2026S	Kit, standard banana plug	21.90
2028S	Kit, standard safety banana plug	21.90
2043S	Kit, 90 $^{\circ}$ male safety banana plug	21.90

## PROBE MASTER Deluxe Test-Lead Kit

The deluxe kit includes: 2 leads (PM9152), 2 probes (PM9153), 2 spade lugs (PM1959), 2 alligator clips (PM9156), 2 extender probes (PM9154), 2 mini-gator leads (PM9161), 2 sprung-hook leads (PM9164), 2 .025" wire-wrap leads (PM9168), 2 pico hooks for W.W. (PM4958), 2 pincer hooks for W.W. (PM4956), 2 sprung-hook probes (PM9169), 1 pincer probe (PM9171), and 1 pouch (PM9176).

- Retractable safety shroud • Silicone leads, burn-resistant • Self-cleaning gold-leaf contacts • 18 ga (440 strand), 48" long



P/N	Description	Each
9104R	Deluxe kit	\$67.90

## FLUKE Digital Pressure/Vacuum Module

The FLUKE PV350 turns your digital multimeter into a complete measuring system. Designed as a compact module that plugs into standard-diameter banana jacks on the front of any DMM, the PV350 provides high-accuracy, high-resolution digital pressure and vacuum measurements.

- Digital-pressure and vacuum measurements in a single module • Transducer sealed in 316 stainless steel, compatible with a variety of liquids and gases • Measures vacuum to 29.9" Hg



P/N	Description	Each
PV350	Digital pressure/vacuum module	\$269.00

## ITT POMONA DMM MAXI KIT

This DMM test-probe kit features quality design versatility, and the right accessories.

This kit includes 2 each of the following: extendable-tip probe leads, replaceable-tip probe handles, pop-jack leads, couplers, medium alligators, heavy-duty alligators, MINIGRABBER<sup>®</sup> leads, MINIPINCER<sup>®</sup> leads, slide-on IC tips (1 black, 1 red), spade lugs, dog-leg micro-tips, needle tips, shouldered micro-tips, and four Std brass tips



P/N	Description	Each
5677A	MAXI-KIT	\$95.00

## ITT POMONA Electrical DMM Test-Lead Kit

The kit includes 2 each (black/red) of the following: probe handles, extra-large alligator clips, slice-on extended tips, pop-jack silicone leads, medium alligator clips, and couplers—2 spade lugs are also included.

- Supplied with nylon pouch

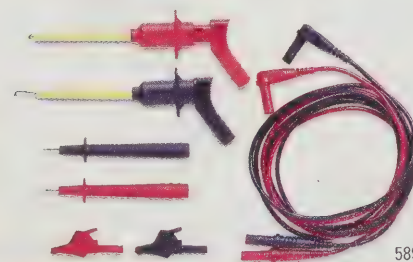


P/N	Description	Each
5673B	Electrical DMM test-lead kit	\$44.00

## ITT POMONA Multiuse DMM Test-Lead Kit

The kit includes 2 each (black/red) of the following: probe handles, right-angle to straight-plug silicone test leads, flexible MAXIGRABBERS with pincer tips, and medium alligator clips.

- Supplied with nylon pouch • All test accessories conform to IEC1010 standards



P/N	Description	Each
5899	Multiuse DMM test-lead kit	\$49.00



## High-accuracy, high-performance digital thermometers

### FLUKE 50 Series Digital Thermometers

These digital thermometers combine low-cost, hand-held test-tool technology with laboratory-grade bench-top temperature measurement. Designed for high accuracy and resolution with excellent repeatability, the 50 Series is one of the most advanced yet affordable hand-held thermometer lines in the industry. Both the Models 51 and 52 offer many versatile functions, selected by simple, clearly-labeled push buttons. Both thermometers work with either K- or J-type thermocouples, selectable by the user.

#### Model 51

This is a high-quality, high-performance, single-channel digital thermocouple thermometer with 1 °F or 0.2 °F (1 °C or 0.1 °C) resolution. Resolution applies to the entire measurement range of the instrument. Functions include: selectable readout in °F or °C, easily converted with the push of a button; self-test; and hold mode, which freezes a reading for convenient viewing, then releases it for continued measurements.

#### Model 52

The dual-channel Model 52 has all the capabilities of the 51, plus additional measurement functions and high-performance features. With its dual thermocouple inputs (T1 and T2), the Model 52 can calculate and display the temperature difference between 2 different sources (differential mode) ideal for measuring input-output temperature changes, and trend information. Other features include: scan mode, a unique feature for continuous scanning through a measurement sequence (T1, T2), (T1-T2); and min./max. record, allowing minimum and maximum temperatures from any one of its three channels (T1, T2), or T1-T2) at one time; and user-selected resolution.

### 80TK Thermocouple Module

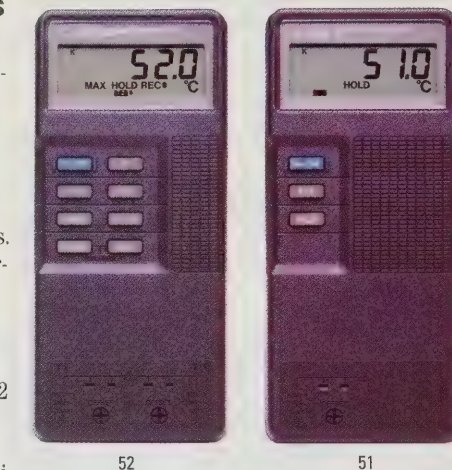
It converts FLUKE DMMs/GMMs and most popular DMMs to a thermometer via standard banana plugs.

- Uses Type-K thermocouples with miniconnectors • Switch-selectable °C or °F • Use with interchangeable 80PK-1 through 80PK-8 Probes (80PK-1 Bead-probe included) • Powered by a standard 9-V battery • Battery-test instructions included

### Noncontact Infrared Temperature Probes

- 80PK-IR (for thermometers only), 80T-IR (for all DMMs and GMMs) • Instantly measures temperature from 0 °F to 500 °F (-18 °C to 260 °C) without contact • Ideal for maintenance applications where the object to be measured is hazardous to touch, moving, easily contaminated, or difficult to reach • Highly repeatable readings • Senses and converts infrared energy emitted from an object into a signal readable on a DMM-, GMM-, or digital-thermometer display • Results displayed in °F or °C: 1 mV DC per °F or °C output • Automatic shut-off, after 10 min of operation, saves battery life

All of the following accessories are compatible with the Models 51 and 52 digital thermometers and the 80TK thermocouple module except for the infrared temperature probe, which is not compatible with the 80TK.



52

51

### TEKTRONIX Digital Thermometers

The DTM900 Series digital thermometers are compact and battery powered. The DTM900 offers basic, easy-to-use temperature measurements and includes: 9-V battery, user manual, holster, and ATP01 probe (2 with DTM920).



DTM900

DTM920

Features	DTM920*	DTM900*
Channels	2	1
Thermocouples	J or K	K
Accuracy: Single Input T1-T2	±(0.1% + 0.7 °C) ±(0.1% + 2 °C)	±(0.1% + 0.7 °C) —
Resolution (°C)	0.1/1	0.1/1
Max. Temperature (-)	-200 °C	-50 °C
Max Temperature (+)	+1370 °C	+1300 °C
Warranty	3 Years	3 Years

\*All characteristics are for the temperature meter only and do not include the temperature probe.

P/N	Description	1-3	4-9	10+
DTM900	Digital thermometer 1 channel	\$99.00	\$94.00	\$89.00
DTM920	Digital thermometer 2 channels	149.00	141.00	130.00

### EXTECH Heavy-Duty Thermometer

These low-cost, wide-range thermo-couple thermometers come in two models with single or dual input. They are accurate and come with a rubber holster and probe.

- ±0.3% basic accuracy • Single or dual input • -58 °F to 2,000 °F (-50 °C to 1,300 °C) ranges • C/F switchable • Offset adjust • Max. reading and data-hold on large LCD • .1° or 1° resolution • Rugged design • Complete with 9-V battery, holster with stand, wrist strap, and Type-K temperature probe(s)



421305

421307

P/N	Description	1-3	4-9	10+
51	Digital thermometer	\$155.00	\$149.00	\$141.00
52	Digital thermometer	205.00	197.00	187.00
P/N	Description	Each		
80TK	Thermocouple module	\$69.00		
80T-IR	Infrared temperature probe	159.00		
80T-IR/E	Extended-range probe (32 °F–1,000 °F only)	195.00		
80PK-IR	Infrared temperature probe (not for 80TK)	159.00		
80PK-1	Bead probe*	13.00		
80PK-2A	Immersion probe	47.00		
80PK-3A	Surface probe	87.00		
80PK-4A	Air probe	64.00		
80PK-5A	Piercing probe	58.00		
80PK-6A	Exposed probe	65.00		
80PK-7	Industrial surface probe	189.00		
80PK-8	Pipe-clamp temperature probe	99.00		

\*1 each included with the Model 51 and the 80TK; 2 each included with the Model 52.

P/N	Description	1-3	4-9	10+
421305	Single input thermometer	\$79.00	\$72.95	\$67.75
421307	Dual input (differential) thermometer	99.00	91.50	83.50
871515	General-purpose probe	35.00	—	—



These hand-held photometers/radiometers/colorimeters are ideal for the laboratory, field, or production area

## TEKTRONIX TEKLUMACOLOR™ Photometers

Each meter accepts 6 interchangeable, precalibrated heads that measure illuminance, luminance, irradiance, radiance, LED output, or color using CIE coordinates. Connection of a head automatically selects the correct measurement units.

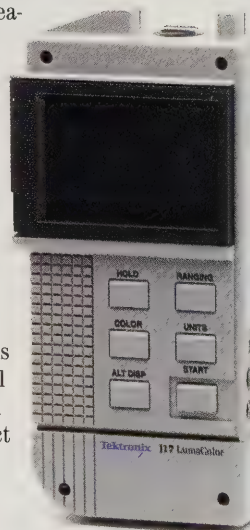
### J17 TEKLUMACOLOR

This unit has a wide measurement range and is ideal for general-purpose light measurement. It is portable and provides great price/performance.

### J18 TEKLUMACOLOR II

The J18 is designed for quick and accurate color measurement, color balancing, and luminance adjustment of display devices such as CRTs, monitors, and TVs.

- 6 precalibrated, interchangeable heads for many different applications
- Accurate spectral and cosine corrections
- Large backlit digital readout
- Connection of head selects correct units automatically
- Color measurement using CIE coordinate



J17

- Portable, battery-operated
- Computer connection via RS-232 (accessory cable required)
- Accurate photopic (eye) correction
- Stable silicon sensors with multielement glass filters
- METRIC or ENGLISH readout selection on front panel
- Rugged and hand-held
- Wide dynamic range

P/N	Description	1-4	5+
J17	TEKLUMACOLOR photometer	\$1095.00	\$1041.00
J18	TEKLUMACOLOR photometer	1995.00	1845.00
J1803	Luminance head	595.00	—
J1805	LED head	595.00	—
J1806	Radiance/radiant intensity head	595.00	—
J1811	Illuminance head	695.00	—
J1812	Irradiance head	795.00	—
J1810	Color head (J18 only)	1495.00	—
J1820	Color head (J17 only)	1495.00	—

**Tektronix**

## EXTECH Infrared Thermometer

- Noncontact, infrared temperature measurements from 14 °F to 572 °F (-10 °C to +300 °C)
- Built-in RS-232 PC interface • 0.1°/1° resolution • °F/°C switchable • 2% basic accuracy
- Wide emissivity adjustment (0.1-.95)
- Large LCD: 0.5"
- Fast 1-s sampling time
- Recall min./max.
- Data hold • Auto off
- Optional data-acquisition software • Complete with protective rubber holster, 9-V battery, and carrying case • 3-year warranty

407428



P/N	Description	1-3	4-9	10+
407428	Heavy-duty infrared thermometer	\$249.00	\$238.00	\$226.00
409997	Pouch carrying case	19.00	—	—
407000	Data-acquisition software and cable	49.00	—	—
380340	Heavy-duty datalogging module	299.00	—	—

## EXTECH Humidity/Temperature Pen

This is a compact digital hygro-thermometer that measures humidity and temperature simultaneously.

- Min. and max. memory functions for both humidity and temperature
- °F to °C switchable
- Measures RH from 25% to 95% with ±5% RH (within 40-80% RH) accuracy
- Measures temperature from 32 °F to 122 °F with 1.5 °F accuracy
- Includes 2 batteries (11/2 V), belt clip, and pouch carrying case



4458CF

P/N	Description	1-3	4-9	10+
4458CF	Humidity/temperature pen	\$55.00	\$49.00	\$45.00

## FLUKE 16 Multimeter with Thermometer

- Accurate temperature measurement from -40 °F to 750 °F (-40 °C to 400 °C)
- Confidently test flame sensor circuits with microamp measurements down to 0.1 micro-amps
- DMM measurements up to 600 V AC or DC
- Auto-ranging
- High-resistance ranges to 40 MΩ
- V-CHECK mode for safety
- 4,000-count digital display
- Meter includes: 80PK-1 bead-probe thermocouple, 80AK temperature adapter, TL75 test leads, and C10 holster



16

P/N	Description	Each
16	Multimeter with thermometer	\$129.00

## EXTECH Photo/Contact Tachometer

This tachometer combines 2 popular measurements into 1 unit with wide measurements up to 100,000 RPM and non-linear surface speeds up to 6,560 ft/min.

- Precise RPM measurements to .05%
- Measures .5 to 20,000 RPM in contact mode, .5 to 99,999 RPM in photo mode
- .1 RPM resolution
- 5-digit LCD
- Min./max.
- Includes wheels, batteries, reflective tape, and case



461895

P/N	Description	1-3	4-9	10+
461895	Combination photo/contact tachometer	\$229.00	\$219.40	\$209.00
461935	Spare reflective tape	4.00	—	—
461899	Set of spare wheels	20.00	—	—

## Light meters with wide measuring ranges in FC and in lux

### EXTECH Light Meters and Adapters

Both light meters offer wide measuring ranges in foot candles and lux.

- All meters/adapters have 5000-Fc and 50,000-LUX measurements in 3 ranges with color and cosine correction
- Fc/LUX meter has 5% basic accuracy, 1 mV per count output, and a .5" LCD
- Heavy-duty light meter has 4% basic accuracy, RS-232 serial interface with data-acquisition software, 1.4" LCD with data hold, and min./max.
- avg. • DMM light adapters have 1mV per count output



401025

407025

P/N	Description	1-3	4-9	10+
401025	FC/lux hand-held meter, with 9-V battery	\$119.00	\$105.00	\$99.50
409996	Pouch carrying case for 401025	15.00	—	—
407026	Heavy-duty light meter, with protective holster	169.00	150.00	133.00
407000	Data-acquisition software for 407026	69.00	—	—
401020	Lux adapter, with 9-V battery	59.00	—	—
401021	FC adapter, with 9-V battery	59.00	—	—
409997	Pouch carrying case for 407025	19.00	—	—



## EXTECH True-RMS Power Analyzer/Appliance Tester

This analyzer/tester measures and audits power consumption and power efficiency of single-phase devices such as small appliances, motors, lighting, ballasts, etc. Four large LCDs simultaneously display watts, amps, power factor/volt amps, and volt/frequency.

- Higher accuracy and better resolution at low current levels (10 mA to 20 A) • Measures from 0.1 W to 2 kW • RS-232 PC interface connects to PC communications port • WINDOWS®-based software monitors watts, amps, etc.; prints reports; saves data in ASCII format; and calculates capacitance change needed to obtain desired power factor • Max. recall, data hold, and overload protection • Powered by internal battery pack or optional AC adapter • Complete with software, serial cable, 8 AA batteries, and carrying case • Model 380803 includes a built-in data-logging function that permits the user to record up to 1,012 readings



380801

P/N	Description	1-4	5+
380801	True-RMS power analyzer	\$799.00	\$649.00
380803	True-RMS power analyzer data logger	899.00	719.00
380817	12-V-AC adapter	19.00	—

## EXTECH Programmable Switches

These timers are all programmable for individual days of the week or a group of days (5 weekdays, 2 weekend days, or all 7 days of the week) within a one-switch setting.

- All models have 6-ON and 6-OFF switching, built-in clock, manual override, battery backup, LED, UL Listed, and individual-day or group-of-days programs • Wall-mount time-switch has a large backlit LCD and a hinged door to protect the keypad • Plug-in time-switch has a 3-prong plug and socket for each connection • Power-strip timer has 3 programmable and 3 manually-controlled outlets with surge protector



P/N	Description	Each
375482	Wall-mount time-switch, 20-A switching, 100 V–240 V, AC	\$59.00
375475	Plug-in time-switch, 15-A switching, 115 V, AC	39.00
375451	Power-strip timer, 15-A switching, 4' power cord, 120 V, AC	69.00

## The advantages of a more expensive, bench-style gaussmeter in a hand-held package

### F. W. BELL Model 4048 Hand-Held Gaussmeter

Fully portable, easy to use, and equipped with features found in units more than twice its size, this hand-held gaussmeter towers above any other in its class. Its custom-formatted 3-1/2-digit LCD provides a large readout of the magnetic field as well as all other information relative to the reading, instrument function, and battery condition. And it comes with everything you need: transverse probe, probe extension cable, zero gauss chamber, 4 AA batteries, and a carrying pouch. Only the world leader in gaussmeter technology could offer so many features for such a low price.

- Auto or manual range-switching • Instant 1-button probe-zeroing • User friendly display prompts • 3-1/2-digit custom-formatted LCD • Scale-suppression • DC and AC field response • True-RMS AC response to 12 kHz • DC and AC peak holds • GAUSS/TELSA reading (switch-selectable)



111497

P/N	Description	1-3	4-9	10+
111494	Gaussmeter	\$769.00	\$755.00	\$725.00
111495	Gaussmeter and hard case	819.00	785.00	753.00
111497	Gaussmeter and axial probe	900.00	875.00	839.00
111496	Gaussmeter with hard case and axial probe	950.00	912.00	876.00

## EXTECH EMF/ELF Meter

This meter measures electromagnetic radiation levels from video terminals, fans, faulty wiring, etc.

- Monitor electromagnetic radiation (.1 mG–199.9 mG) • 2% accuracy • .5" LCD with over-range indication • 2.5-times-per-second sampling time • Frequency bandwidth: 30 Hz–300 Hz • Single axis • Complete with 9-V battery



480822

P/N	Description	1-3	4-9	10+
480822	EMF/ELF meter	\$89.00	\$82.00	\$79.00
409992	Pouch carrying case	10.00	—	—

## DESCO Continuity Testers



### 100 CIRCUITRACER® Voltage and Continuity Tester

The CIRCUITRACER is a three-in-one test lab, shipped with both a high-voltage lamp for utility wiring and a low-voltage lamp for continuity testing. You can trace live voltages up to 600 V AC or DC, or continuity from 0 Ω to 10 Ω.

- Shipped with standard 122 probe tip • Testing unpowered circuits requires 2 AAA batteries (not included) • Range: 0 V–600 V or 0 Ω–10 Ω • Probe: 3 V at 270 mA max.

P/N	Description	1-9	10-24	25+
100	Voltage and continuity tester	\$14.85	\$12.20	\$11.75

### 130 CIRCUITRACER Continuity Tester

This is the continuity version of the CIRCUITRACER. It is shipped with a low-voltage lamp and 2 AAA batteries for testing unpowered circuits from 0 Ω to 10 Ω. The lead end is terminated with a standard alligator clip.

- Range: 0 Ω–10 Ω • Probe: 3 V at 270 mA max.

P/N	Description	1-9	10-24	25+
130	Continuity tester	\$10.55	\$8.85	\$8.50

### 135 Audible CIRCUITRACER

This audible version of the CIRCUITRACER puts out a 2-kHz tone. It is shipped with a 122 nose tip, a 117 alligator clip in its lead, and 1 AAA battery.

- Range: 0 Ω–50 Ω • Probe: 1.5 V at 8 mA max.

P/N	Description	1-9	10-24	25+
135	Audible continuity tester	\$25.35	\$21.40	\$20.60

## 170 Safetracer for EOS/ESD-Sensitive Applications

This unit is specifically designed for testing paths on circuit boards with components mounted. The very low probe voltage does not bias semiconducting devices into conduction. All the semiconducting devices appear as open circuits.

- Uses a 9-V battery • Range: 0 Ω–30 Ω • Probe: 0.2 V at 150 μA max.



170

P/N	Description	1-9	10-24	25+
170	Safetracer continuity tester	\$74.30	\$65.35	\$62.75



# Digital performance at analog prices

## TEKTRONIX Digital Real-Time Oscilloscopes

Featuring an unbeatable combination of performance, price, and functionality, the TDS 200 Series makes it easy for analog users to choose and use digital scopes. In fact, no other digital scopes offer as much bandwidth and sample rate in a single affordable package. By sampling at 10 and 16 times their bandwidths on both channels, the TDS 200 Series scopes provide accurate real-time acquisition to the full bandwidth. And, waveform storage makes it easy to save waveforms for later analysis, comparison, or printing.

- Affordable, high-performance scopes that minimize aliasing and provide higher resolution waveforms
- Available in 60-MHz and 100-MHz models, each features cursors with readout, 2 reference waveforms, 5 setup memories, 5 automatic measurements, and auto-set
- Light-weight (3.25 lb), small (footprint fits anywhere, 12" x 5.95" x 4.75")
- Hard-copy extension module makes it easy to add screen hard-copy capability
- Includes: (2) P6112 passive probes, user manual, power cord, NIST-traceable certificate of traceable calibration
- 3-year warranty

## TEKTRONIX/HUNTRON TRACKER

- Combines the power of HUNTRON TRACKER technology with a TEKTRONIX digital-storage oscilloscope
- Built-in signal source, multiple frequency ranges, and a current setting allow the TR210 to evaluate the relative condition of common integrated ICs (in a power-off mode) while they are installed in circuit boards
- Dual-channel capability on the TR210 makes it very easy to compare inputs on logic circuits
- BNC cable not included

Features	TDS 210	TDS 220
Bandwidth	60 MHz	100 MHz
Channels	2	
Max. Sample Rate	1 GS/s on Each Channel	
Sweep Speeds	5 ns/div. to 5 s/Div.	
Vertical Sensitivity	10 mV/div. to 5 V/Div. at Full Bandwidth; 2 mV/Div. to 5 mV/div. at 20 MHz	
Record Length	2,500 Points/Channel	



P/N	Description	1-3	4+
TDS210	60-MHz digital real-time oscilloscope	\$995.00	\$949.00
TDS220	100-MHz digital real-time oscilloscope	1795.00	1715.00
TDS2CM	RS-232, GPIB, and CENTRONICS-compatible printer interfaces	265.00	250.00
TDS2HM	CENTRONICS-compatible printer interface	175.00	165.00
TDS2MM	Measurement module (FFT and communications)	495.00	462.00
AC220	Soft carrying case	Each: 65.00	
P6112	100-MHz, 10x replacement probe	Each: 75.00	
RM200	Replacement kit	Each: 199.00	
P/N	Description	Each	
TR210	TEKTRONIX/HUNTRON TRACKER	\$995.00	

## HUNTRON TRACKER® 2000

The HUNTRON TRACKER 2000 provides advanced troubleshooting capabilities to simplify the testing of new-technology components such as CMOS and MOS circuits. Its built-in pulse generator lets you thoroughly troubleshoot gate-fired devices such as SCRs, TRIACs, and optocouplers. By energizing the gate, you can test a component in an active mode.

- Test components and boards without power—ideal for catastrophic failures
- Get a picture of a component's overall health—including intermittent problems
- Test gate-fired devices with a built-in pulse generator
- Nondestructive testing
- Includes HUNTRON  $\mu$ Probes (1 pair), common test leads, 2 mini-clip leads, power cord, and instruction manual



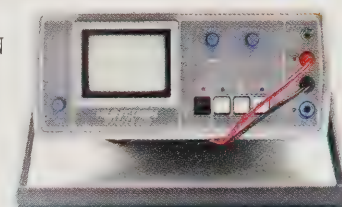
2000

Test Frequency	50 Hz/60 Hz, 400 Hz, 2,000 Hz
Functions	
Range Selection	Auto or Manual, High-Range Lockout
Compare-A-Trace	Adjustable (0.5 Hz to 10 Hz)
Line Voltage	100-V AC, 115-V AC, or 230-V AC

P/N	Description	Each
2000	HUNTRON TRACKER 2000	\$1895.00

## HUNTRON TRACKER® 1000

- Display the condition of dynamic semiconductors without applying system power to them
- Troubleshoot catastrophic failures
- Find components whose performance is degraded due to current leakage
- Non-destructive testing
- Includes HUNTRON  $\mu$ Probes (1 pair), common test leads, power cord, and instruction manual



1000

Test Frequency	80 Hz
Functions	
Range Selection	Manual
Compare-A-Trace	Fixed Rate (0.8 Hz)
Line Voltage	100-V AC, 115-V AC, or 230-V AC

P/N	Description	Each
1000	HUNTRON TRACKER 1000	\$750.00

## HUNTRON DSI 700

- Interfaces the HUNTRON TRACKER 2000 to a PC for test-routine generation and storage
- Prints a prioritized problem list to simplify troubleshooting
- Operates in a semiautomatic or manual mode (with or without a PC)
- Creates a permanent troubleshooting database
- Includes two 40-pin DIP clip cables; two 20-pin DIP clip cables; two each of the 8-, 16-, 18-, 20-, 24-, 28-, and 40-pin DIP clips; power/clock cable; two dual-banana leads; parallel cable; and instruction manual



DSI700

P/N	Description	Each
DSI700	DSI 700	\$3495.00



Digital real-time (DRT) acquisition—now with RS-232 interface and extended waveform math (FFT) for the same low price

**Tektronix**

### TEKTRONIX TDS 640A

This oscilloscope provides an excellent combination of affordability and high performance. It delivers a 500-MHz bandwidth and 2-GS/s, digital, real-time acquisition on all 4 channels simultaneously. To help users stay on task, extensive on-line help provides answers to most questions—reducing the need to reference manuals. The TDS 640A also has extensive triggering capabilities: edge trigger, logic trigger (pattern and state), pulse triggers (width, runt, glitch), and an optional video trigger.

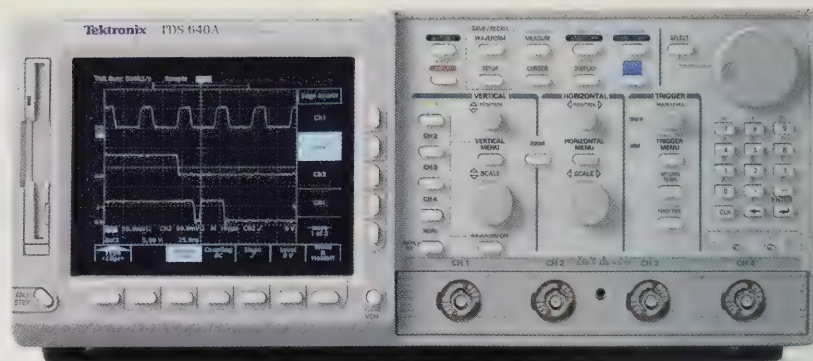
If you need multiple channels of high-speed data acquisition for detailed measurement of high-speed digital circuits or advanced triggering in order to trigger on specific pulses, logic states or logic patterns, the TDS 640A is for you. With a fast and intuitive user interface, digital real-time acquisition system, excellent timing accuracy, 25 built-in measurements, and advanced signal processing capability, the TDS 640A provides unsurpassed performance in its price range.

- 500-MHz bandwidth • 2-GS/s sample rate on 4 channels • Time interval, 2-ns glitch, runt, pattern, and state triggering • 1-mV to 10-V/div. sensitivity • Infinite and variable persistence • Record length to 2,000 points • 8-bit

P/N	Description	1-3	4+
<b>TDS640A*</b>	500-MHz oscilloscope, includes 4 probes	\$9950.00	\$9549.00
<b>OPT 1R*</b>	Rack mount kit	400.00	—
<b>OPT 05*</b>	Video trigger	1495.00	—
<b>K420</b>	Workbench cart for TDS640A	795.00	—
<b>P6243</b>	1GHz active FET probe	395.00	—
<b>P6245</b>	Active FET probe	1595.00	—

NOTE: Add option price to TDS640A base price. \*Options are special order items.

TDS640A



resolution, 11-bit with averaging • 1.5% vertical accuracy • FFT, integration, differentiation • 25 automatic measurements • Full GPIB programmability • 3.5" 1.44-MB floppy drive • HDTV triggering (optional) • 3-year warranty

Includes: 4 each P6139A passive probes, reference card, user manual, programmer's manual, front cover (200-3696-00), U.S. power cord (161-0203-01), performance verification

#### The Right Probe for the Right Price

The P6243 active FET probe efficiently complements the performance of the TDS640A which provides power through the probe connection.

Typical measurements requiring an active probe: • Circuit characterization or troubleshooting when the test impedance is unknown or not easily calculated, or when the ground lead is several inches long • Small-signal circuit analysis • Characterization of high-frequency circuits (>350 MHz)

#### K420 Workbench Cart

The K420 workstation cart ergonomically improves work bench efficiency and makes the key components of a test bench portable.



### HEWLETT PACKARD HP 54615B 500-MHz Oscilloscope

This is a 2-ch., 500-MHz, 1-GS/s oscilloscope. With a horizontal accuracy of 0.005% and horizontal resolution of 20 ps, you can uncover the details that hide from slower scopes.

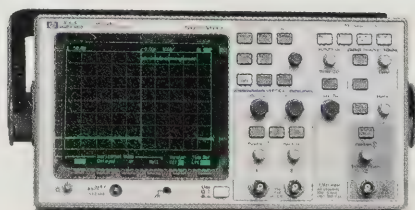
- 2 probes (10073A): 1.5 m, 10x • Line cord • Operating and service guide

P/N	Description	Each
<b>54615B/ABA</b>	2-ch., 500-MHz, 1-GS/s oscilloscope	\$5695.00

### HEWLETT PACKARD HP 54610B 500-MHz Oscilloscope

This is the lowest-priced 500-MHz scope on today's market. It has a  $\pm 0.1\%$  horizontal accuracy and a max. display-update rate of 1.5 million points per second.

- 2 probes (10073A): 1.5 m, 10x • Line cord • Operating and service guide



54610B

P/N	Description	Each
<b>54610B/ABA</b>	2-ch. 500-MHz oscilloscope	\$4495.00

### HEWLETT PACKARD HP 54616B/C 500-MHz Oscilloscopes

The HP 54616B (monochrome) and the HP 54616C (color) offer the highest sample rate available in the HP 54600 Series. At 2 GS/s, these scopes can capture signals up to 500 MHz—single shot or repetitive. With features like 1-ns peak detect, 5 K of memory, responsive display, and 1-MB or 50- $\Omega$  inputs, these scopes can meet your present and future troubleshooting needs.

- 2 probes (10073A): 1.5 m, 10x • Line cord • Operating and service guide



54616C

P/N	Description	Each
<b>54616B/ABA</b>	Monochrome oscilloscope, 2 chs., 500 MHz, 2 GS/s	\$6695.00
<b>54616C/ABA</b>	Color oscilloscope, 2-ch., 500 MHz, 2 GS/s	7695.00
<b>E2657A/ABA</b>	Measurement/connectivity kit for HP-IB	695.00
<b>E2659A/ABA</b>	Measurement/connectivity kit for RS-232	695.00
<b>Accessories</b>		
<b>10073A</b>	Replacement probe	156.00
<b>10098A</b>	Accessory pouch and front-panel cover	52.00
<b>5062-7345</b>	Rack-mount kit	250.00
<b>34810B</b>	BENCHLINK scope software for WINDOWS	300.00

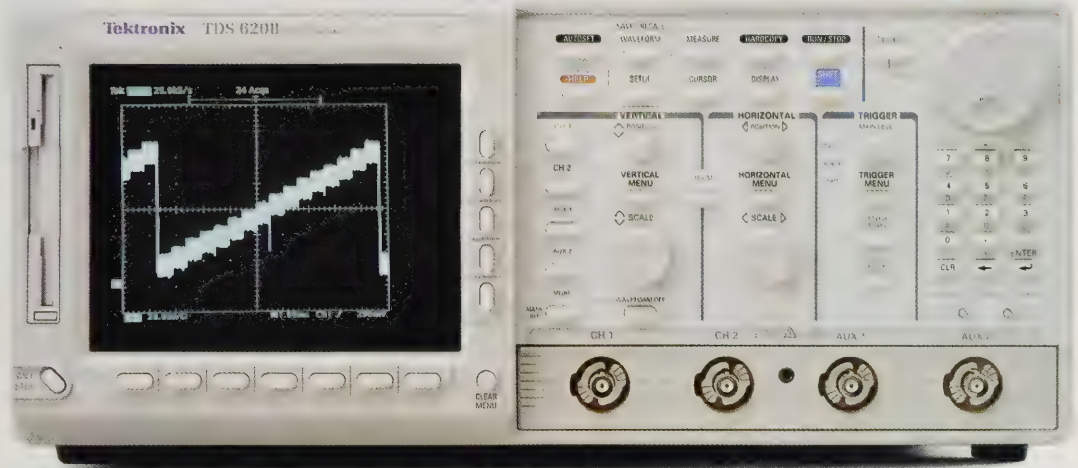


## TEKTRONIX TDS 620B DIGITAL REAL-TIME™ Oscilloscope

If you need to capture longer time windows and solve problems when the cause and effect are separated in time, turn to the TDS 620B DIGITAL REAL-TIME oscilloscope. Featuring a 15-KB record length, advanced triggering, and greater accuracy, this high-performance scope gives you the detailed measurements you need, whether you're involved in research, system integration, or sophisticated troubleshooting.

The TDS 620B comes standard with an RS-232 CENTRONICS interface and FFT.

- Faithfully reproduces signals with single-shot acquisition
- Captures wide range of signal anomalies
- Offers advanced triggering features and greater accuracy
- Increased bandwidth enables complex signal analysis
- Includes: 2 probes (P6139A), user manual, and certificate of traceable calibration



TDS620B

Features	TDS 620B
Bandwidth	500 MHz
Max. Sample Rate	2.5 GS/s/Channel
Channels	2+2 Auxiliary
Sweep Speeds	200 ps/Div., 10 s/Div.
Vertical Sensitivity	1 mV/Div.-10 V/Div.
Vertical Resolution	8 Bits
Record Length	15 KB
Advanced Features (Included)	14 Hard-Copy Formats, 25 Automatic Measurements, Pass/Fail Limit Testing, Advanced Signal Processing and Triggering, Floppy-Disk Drive, FFT Math, RS-232 CENTRONICS Interface

P/N	Description	Each
TDS620B	500-MHz oscilloscope	\$8425.00
OPT1R*	Rack-mount kit	400.00
OPT05*	Video trigger	1495.00
P6139A	500-MHz probe	299.00

\*Options are special-order items. Add option price to TDS620B base price.

## TEKTRONIX TDS540C 500-MHz Oscilloscope

The TDS540C incorporates the high performance and ease-of-use of the familiar TDS oscilloscopes to provide the most comprehensive troubleshooting, debugging, and measurement capabilities, allowing engineers to connect to, capture, and characterize complex, high-speed electronic designs.

InstaVu acquires and displays waveforms up to 1,000 times faster than any DSO or analog scope. Instantly uncovers the infrequent signal events that can escape other scopes.

- GP includes: • GPIB • Disk drive • Four P6139A probes • Reference manual • User manual • Technical reference • Programmers manual • NIST certificate

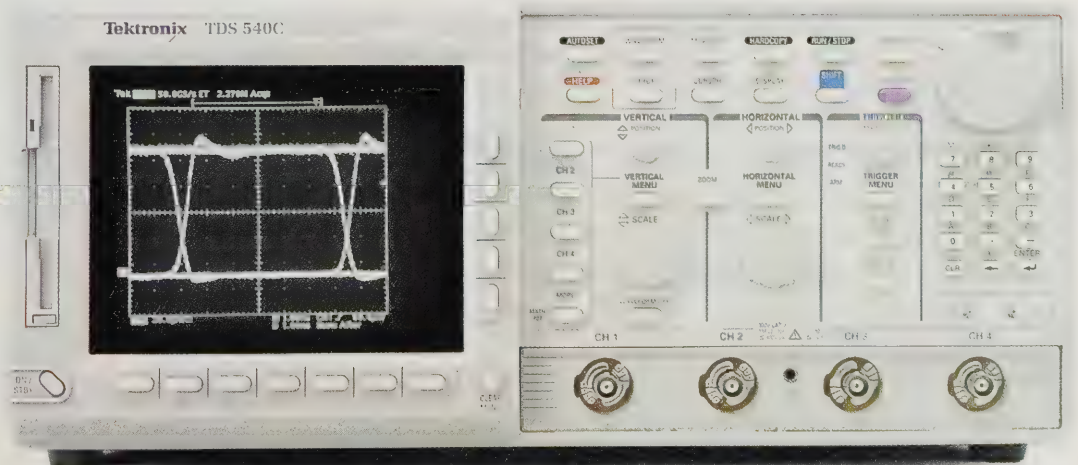
- XL option includes: • FFT and advanced math • 500-k record length

**InstaVu™**

UP TO 500 k OF MEMORY

### Base Unit

Channels	4
Bandwidth	500 MHz
Max. Sample Rate	2 GS/s
1 Channel	2 GS/s
2 Channel	1 GS/s
3 & 4 Channels	500 MS/s
Record Length	50 k/channel



TDS540C-GP

P/N	Description	Each
TDS540C-GP	TDS540C with RS-232 Centronics interface	\$16,245.00
TDS540C-XL	TDS540C with FFT and 500-k record length	19,235.00



New Product: This symbol represents the industry's latest offerings.



## TEKTRONIX TDS 400A Series Personal Lab Scopes

These personal lab scopes combine excellent performance and broad feature sets with affordable prices—for professionals who demand high precision and fidelity from their instruments.

### Power That Is Easy to Use

The TDS 400A Series utilizes the renowned TDS graphical user interface which has intuitive, icon-based menus and help text—to simplify its operation. Knobs and buttons allow easy selection of commonly-used functions.

### Complete Solutions

Powerful features such as the exclusive HI-RES™ mode, waveform zoom, template testing, roll mode, and 25 automatic measurements make the TDS 400A Series scopes great time-savers and productivity enhancers. This rich feature set allows the TDS 420A, 430A, and 460A to provide complete solutions to your measurement needs including: precision signal conditioning, acquisition performance, signal processing and analysis, and results generation.

### Precision Signal Conditioning for High-Fidelity Acquisitions

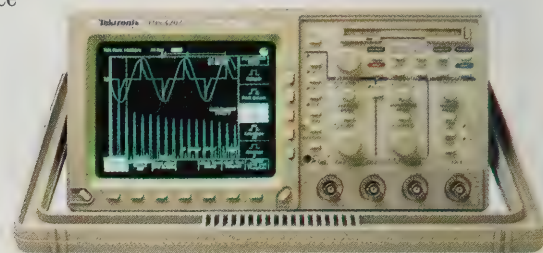
The TDS 400A Series offers laboratory-caliber performance with 1-mV/div. sensitivity, 1.5% acquisition amplifier accuracy, wide dynamic range, fast overdrive recovery, flat response, calibrated offset, and 8-bit vertical resolution (up to 12 bits with HI-RES). Bandwidths of 200 MHz and 400 MHz at the probe tips (typical) and 100-MS/s sampling on all channels, coupled with 120,000-point record lengths, provide acquisition power and flexibility to suit a host of applications requiring high quality and precision, such as ISO 9001 conformance and quality testing.

### Features

- 200 MHz and 400 MHz bandwidths • 4 channels each with 100-MS/s sampling rate (2 channels on TDS 430A) • Record lengths up to 120,000-points per channel with 30,000 points standard • Advanced signal-processing

functions (FFT math) • 10-ns peak-detect mode for high-speed glitch capture • Waveform pass/fail testing • Roll mode • 1.5% vertical accuracy • 8-bit vertical resolution and up to 12 bits with HI-RES • Video trigger • 3.5" DOS floppy drive • Dual-window zoom • 25 automatic measurements • Infinite and variable persistence

- External clock (up to 10 MHz)
- Safe high-voltage-differential measurements (to 1,300 V with P6200) • 3-year warranty



TDS420A

### Standard Accessories

- Probes: (2) P6138A for TDS430A, (4) P6138A for the TDS420A and TDS460A
- Reference manual • User's manual • Programmer's manual • U.S. power cord
- NIST traceable certificate of calibration

### XL Series

- Includes all standard accessories plus 120 k memory, RS-232 interface, FFT software, pouch, and cover

P/N	Description	1-3	4+
TDS430A	2-channel, 400-MHz, digitizing oscilloscope	\$4995.00	\$4806.00
TDS430A-XL	2-channel, 400-MHz, digitizing oscilloscope	5990.00	5763.00
TDS420A	4-channel, 200-MHz, digitizing oscilloscope	6595.00	6344.00
TDS420A-XL	4-channel, 200-MHz, digitizing oscilloscope	7590.00	7299.00
TDS460A	4-channel, 400-MHz, digitizing oscilloscope	7685.00	7393.00
TDS460A-XL	4-channel, 400-MHz, digitizing oscilloscope	8680.00	8350.00

## TEKTRONIX Differential Probes

### ADA400A Differential Probe

Now low-level differential measurements can be made on any TEK scope. The ADA400A pre-amplifier is perfect for low-frequency differential measurements or low-amplitude, single-ended measurements with lots of noise.

- Provides low-level signal acquisition capability to DSOs • 10-pV/div. sensitivity • Low-pass filters for 100 Hz, 3 kHz, 100 kHz, and full (1 MHz)
- CMRR: >100 dB DC to 10 kHz • Selectable gain: 100, 10, 1, or 0.1

### P5200 High-Voltage Differential Probe

The P5200 enables users to make floating measurements with the scope grounded. This results in safer, more accurate measurements, and higher productivity. The P5200 is ideal for power-supply design, motor-drive design, electric-vehicle

research, education, and the field-service industry.

- Makes safe floating measurements with grounded scope • 1,300-V max. differential input voltage
- $\pm 1,000$ -V max. floating voltage on all ranges
- 25-MHz bandwidth

### P5205 Differential Probe

This probe enables users to safely make measurements of floating circuits with their oscilloscopes grounded. The P5205 active differential probe converts floating signals that can be displayed safely and easily on any ground-referenced oscilloscope that has the TEKPROBE™ interface.

- 100 MHz • Power from TEKPROBE interface

P/N	Description	Each
ADA400A	Differential probe	\$995.00
P5200	High-voltage differential	450.00
P5205	Active differential probe, 100 MHz	995.00

## TEKTRONIX Instrument Cart

- Column and trays made from high-strength aluminum, base is thermoset polyester • Low-cost portability • For all portable instruments • Sturdy and mobile platform • Tiltable top tray • Locking front casters • 4-outlet U.S. power-strip option

P/N	Description	Each
K212	Portable instrument cart	\$450.00
K212-10	Cart with four-outlet power-strip	530.00
K475	Workstation tower	975.00

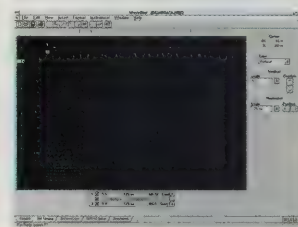


K212

## TEKTRONIX WAVESTAR™ Software

This new WINDOWS® application program allows you to create electronic lab notebooks on your PC for recording digital-storage-oscilloscope measurements. With it, you can acquire waveforms from the following units: TDS 200, 300, 400, and 600 Series; and the THS 700 Series.

- Capture waveforms and settings from DSO
- Annotate, organize, and analyze data • Store waveforms, pictures, settings, and notes • Exchange waveforms and data with other WINDOWS applications software • Restore waveforms and settings to DSO • Requires WINDOWS 3.1
- Waveform data can be viewed in graphical form or as a list of numbers in tabular form



P/N	Description	Each
WSTR31	WAVESTAR software	\$295.00



We are a full-service distributor with a broad range of the best products.



We provide world-class quality ISO-9002-certified services and facilities.



## Now includes GPIB/RS-232 interface and WAVESTAR® software

### TEKTRONIX 300 Series Digital Real-Time Oscilloscopes

These are the first low-cost scopes with the power to acquire signals over their entire bandwidth with minimal aliasing, even when measuring high-speed transient and single-shot events. Their intuitive interface combines dedicated knobs with menu-driven digital functions, 21 automatic measurements, FFT information-enhancing display modes, and both edge and basic video triggering are standard. Compared to the previous TDS 300 Models, the new TDS 300 Series gives you twice the bandwidth and twice the sample rate,



#### TDS 300 Series Specifications

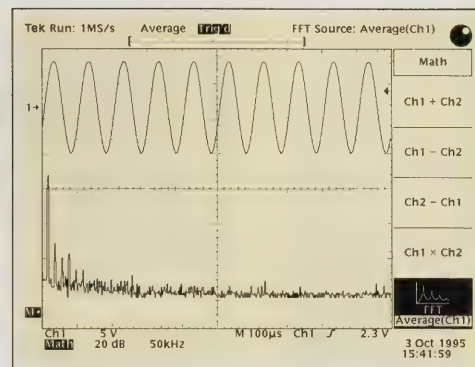
Features	TDS 340A	TDS 360	TDS 380
Bandwidth	100 MHz	200 MHz	400 MHz
Sample Rate (Each Channel)	500 MS/s	1 GS/s	2 GS/s
Time/Division Range	5-ns to 5-s/div.	2.5-ns to 5-s/div.	2.5-ns to 5-s/div.

P/N	Description	1-3	4+
TDS340A-14-SC	100-MHz digital oscilloscope	\$3395.00	\$3245.00
TDS360-14-SC	200-MHz digital oscilloscope	3695.00	3467.00
TDS380-14-SC	400-MHz digital oscilloscope	4995.00	4770.00

plus these valuable features: FFT (Fast Fourier Transform) analysis on all three models and a built-in 3.5" floppy-disk drive.

- 2 channels • 3.5" floppy-disk drive • FFT analysis • 2-mV/div. to 10-V/div.
- Auto setup • Accumulate display modes • 2% vertical accuracy • 1-k record length • Roll mode • 21 automatic measurements • 10-ns peak detect for high-speed glitch capture • GPIB, RS-232 programmability, parallel printer, and VGA interfaces • WAVESTAR software included • 3-year warranty

Includes: • User and reference manuals • NIST-traceable certificate of calibration • U.S. power cord • 2 each P6109B 10x passive probes (TDS 340A), 2 each P6111B 10x passive probes (TDS 360), 2 each P6114B 10x passive probes (TDS 380)



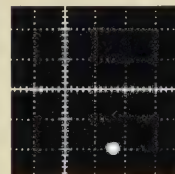
#### FFT in Every Model

FFT displays a signal in the frequency domain, adding another level to the information available to you. FFT is useful for analyzing the harmonic content of signals in power supplies, noise in mixed digital/analog systems, line-current harmonics, and vibration systems.

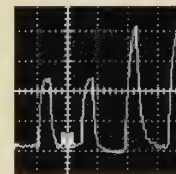
#### The Power of Digital Real-Time

Because the TDS 300 Series offers the added performance of digital real-time, it's hard to fairly compare it to other instruments on the market. It gives a whole new dimension to the performance paradigm.

You can choose to buy a TEKTRONIX digital real-time oscilloscope that shows you the entire waveform, or a competing scope that can display only a single dot on the screen.



Single-event capture using equivalent-time sampling. One point captured.



Single-event capture using digital real-time. Entire waveform captured.

#### Built-in DOS-Compatible Floppy Drive

For design and repair applications, the built-in 3.5" floppy-disk drive is useful for storing reference waveforms, downloading waveforms and setups, and importing and exporting waveforms to a PC for later use.

- Save screen shots to disk in INTERLEAF, TIFF, PCX, BMP, and EPS formats for desktop publishing
- Export waveforms to disk in data formats compatible with spreadsheet and analysis programs like EXCEL™, LOTUS 1-2-3™, and MATH CAD™
- Speed routine testing by saving up to 700 scope setups per disk
- Store up to 600 waveforms per disk for later comparison or troubleshooting

## From the bench

### THE LAY PERSON'S GUIDE TO DIGITAL REAL-TIME

Courtesy of Tektronix

All digital scopes have an internal device called an analog-to-digital converter. Basically, this device converts the incoming analog signal into digital samples so the scope can store and display it. The rate at which the device captures or "samples," the analog signal is called the sample rate. When it comes to "sample rate," more is better.

There is a mathematical principle that determines how many samples are enough. The Nyquist sampling theorem states that a scope must sample more than 2x as fast as a sine wave to reliably reconstruct and display that sine wave. In order for TEK to call a scope digital real-time, it must have a sample rate at least 4x its stated bandwidth—all TDS 300 Series scopes have sample rates of 5x their bandwidth.

Because the TDS 300 Series digital real-time oscilloscopes are designed with 1 analog-to-digital converter for each channel, the 5x sampling rate is true no matter how many channels are being used. Most competitive models use only one A/D converter for all channels, so the sample rate is divided every time an additional channel is turned on.



## HEWLETT PACKARD 100/150-MHz Oscilloscopes

The HP 54600B is ideal for production testing, field service, and education—where you need solid, dependable scopes at a low price.

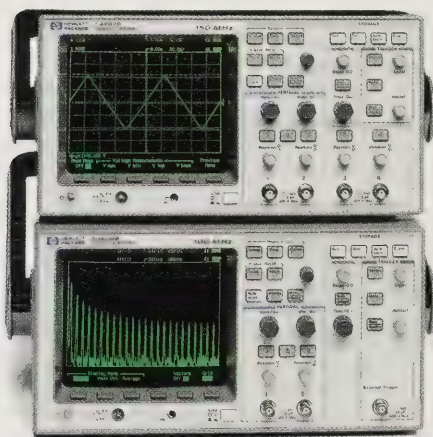
- 100-MHz bandwidth

Includes: • 2 probes (10071A): 1.5 m, 10x • Line cord • Operating and service guide • 2 input chs. • Time-base range: 2 ns/div.-5 s/div.

When your needs for a high-quality lab scope go past 100 MHz, consider the HP 54602B. It has the same capabilities as the other HP 54600 Series scopes, plus the advantages of a 150-MHz bandwidth and 1-mV/div. sensitivity.

Includes: • 2 probes (10071A): 1.5 m, 10x • Line cord • Operating and service guide • 4 input chs. (2+2) • Time-base range: 2 ns/div.-5 s/div.

54602B/ABA



54600B/ABA

P/N	Description	Each
54600B/ABA	100-MHz oscilloscope	\$2550.00
54602B/ABA	150-MHz oscilloscope	\$3050.00

## HEWLETT PACKARD Oscilloscope Probes

The HP 10070 Series probes are designed for the HP 54600 Series scopes—the probes are passive, general-purpose, and rugged. The HP 10400 Series offers a wide range of passive probes that feature superior reliability and electrical performance in a miniature package. The narrow, sharp probe tip is good for surface-mount devices.

P/N	Description	Length	Division Rate	Each
10070A	20-MHz probe	1.5 m	1:1	\$59.00
10071A	150-MHz probe	1.5 m	10:1	79.00
10073A*	500-MHz probe	1.5 m	10:1	156.00
10074A*	150-MHz probe	1.5 m	10:1	84.00
10072A	SMT kit with 10 grabbers	N/A		67.00
10441A	500-MHz probe	2 m	10:1	235.00
10444A	500-MHz probe	1.6 m	10:1	235.00
10431A	500-MHz probe	1 m	10:1	234.00
10450A	SMT kit with 10 grabbers	N/A		85.00
34300A	High-voltage probe, 40-kV AC/DC			92.00
34130A	Deluxe test-lead set			36.00

\*Includes probe sense pin

## HEWLETT PACKARD HP 54645A MEGAZOOM Oscilloscope

This is no ordinary 100-MHz oscilloscope. It may look and operate like other HP 54600 Series scopes but there is a big difference—it's running on 1 MB of memory.

The HP 54645A brings you the advantages of deep memory without any of the disadvantages usually associated with this class of oscilloscopes. This is a 2-ch. 100-MHz oscilloscope with 200 MS/s and 1 MB per channel. Through the application of MEGA-ZOOM® technology, this deep-memory oscilloscope is able to provide a high-speed/low-dead-time display and a highly responsive front panel. Pan and zoom operations are simple, just turn the time/div. knob. A powerful glitch trigger extends the power of the MEGAZOOM technology—to solve your toughest troubleshooting problems.

- 100-MHz bandwidth • 200 MS/s and 1 MB of memory per ch. • Screen-update rate: 3 million pts./s
- Vertical sensitivity: 1 mV/div.-5 V/div. • Time base: 2 ns/div.-50 s/div.

Includes: • 2 probes (10074A): 1.5 m, 10x • Line cord • Operating and service guide

## HEWLETT PACKARD HP 54645D Mixed-Signal Oscilloscope

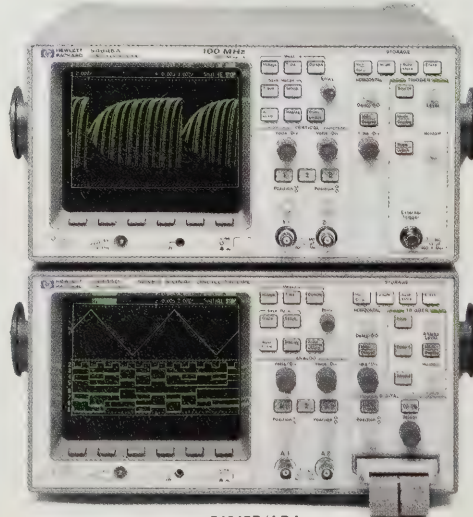
This new oscilloscope combines the detailed signal analysis of a scope with the multichannel timing measurements of a logic analyzer and the benefits of deep memory. Plus, it offers the exclusive new HP MEGAZOOM technology.

With the mixed-signal display and powerful triggering, you can capture and analyze the signals and relationships that matter most. No more guesswork, and no more poking around a few channels at a time.

The design behind the HP MEGAZOOM solves the problems of both sluggish response and complex operation—commonly associated with deep memory. So not only do you get a great 2-channel scope, you also get the capture and analysis power of deep memory on all 18 channels.

- 2 scope probes (10074A) • Logic cable • Power cord • Operating and service guide

54645A/ABA



54645D/ABA

HP 54645D Mixed-Signal Oscilloscope		
Total Channels	2 scope + 16 logic—synchronized	
Scope Channels		
Bandwidth	100 MHz (75 MHz @ <10 mV/div.)	
Number of Channels	2	
Max. Sample Rate	200 MS/s	
Memory Depth	1 M points/channel	
Peak Detect	5 ns (min.)	
Input Impedance	1 MΩ, 13 pF	
Max. Input	400 V (DC + peak AC)	
Range	1 mV/div.-5 V/div.	
Resolution	8 bits	
Coupling	AC, DC, ground	
Logic Channels		
Number of Channels	16 (2 8-channel pods)	
Max. Sample Rate	400 MS/s (1 pod active), 200 MS/s (2 pods active)	
Memory Depth	2 M points/channel (1 pod active), 1 M points/channel (2 pods active)	
Input R and C	100 kΩ, 8 pF	
Input Level	±40 V (max.), 500 mV P-P (min.)	
Threshold Range	±6.0 V in 50-mV increments	
Predefined Thresholds	TTL (1.4 V), CMOS (2.5 V), ECL (-1.3 V)	
Peak Detect	5 ns (min.)	
Time Base		
Range (Main and Delayed)	5 ns/div.-50 s/div.	
Accuracy (Nonvernier Ranges)		
Scope, Same Channel	±0.01% of reading ±0.2% of screen width ±40 ps	
Scope, Channel to Channel	±0.01% of reading ±0.2% of screen width ±80 ps	
Logic, Same Channel	±0.01% of reading ±0.2% of screen width ±(1 logic sample period, 2.5 ns or 5 ns) ±ch.-to-ch. skew	
Logic, Channel to Channel	±0.01% of reading ±0.2% of screen width ±(1 logic sample period, 2.5 ns or 5 ns) ±ch.-to-ch. skew	
Triggering		
Sources	All channels and line	
Glitch Triggering	Min. width 8 ns operators: < >, or range	
Logic-Trigger Modes	Edge, pattern, glitch, advanced pattern, TV advanced pattern operators: "and", "or", "then entered", "exited" duration time, duration >, duration <	
Power	100 V AC-240 V AC, 45 Hz-440 Hz, 90 V A	
Warranty	3 years	

P/N	Description	Each
54645A/ABA	Oscilloscope, 2-ch., 100 MHz	\$3495.00
54645D/ABA	Mixed-signal oscilloscope	4995.00
54650A	HP-IB interface module	295.00
54652B	RS-232/parallel interface module	295.00
54657A/ABA	HP-IB measurement/storage module	495.00
54659B/ABA	RS-232/parallel measurement/storage module	495.00
Accessories		
10098A	Accessory pouch and front-panel cover	52.00
5062-7345	Rack-mount kit	250.00
34810B	BENCHLINK scope software for WINDOWS	300.00
10074A	Replacement probe	84.00



## B&K 500-MHz and 1,050-MHz Spectrum Analyzers

These new spectrum analyzers measure low-amplitude signals with a range that is over 113 dB (-100 dBm to +3 dBm) with 80 dB being displaced on the screen at 10 dB/div.

The maximum input level is +20 dB. Both units come with a built-in tracking generator.



2630

Features	2620	2630
Frequency Range	150 kHz–500 MHz	150 kHz–1,050 MHz
Dynamic Range	80 dB (113 dB with attenuation)	
Resolution Bandwidth	12.5 kHz and 250 kHz	20 kHz and 400 kHz
Sweep Rate	43 Hz	
Amplitude Range	-100 dBm to +13 dBm	
Reference Level	-27 dBm to +13 dBm (in 10 dB steps)	
Reference Level Accuracy	±2 dB	

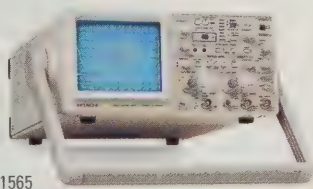
P/N	Description	Each
2620	500-MHz spectrum analyzer	\$2195.00
2630	1,050-MHz spectrum analyzer	\$3395.00

## HITACHI Analog Oscilloscopes

These oscilloscopes are designed to provide the basics in waveform observation.

• Simple to operate • Accurate • Direct reading of measured values • Autoranging sweep time • Automatic trigger level • Large 6" CRT • Manufactured in an ISO-9002-certified facility • Options: front cover, accessory pouch, dust cover, and viewing hood

All HITACHI analog oscilloscopes include: 10:1 and 1:1 probes and an operator's manual.



V-1565

Features	V-1560	V-1565	V-1585
Bandwidth	100	100	100
Input Channel	2	2	4
Rise Time	<3.5 ns	<3.5 ns	<3.5 ns
Vert. Deflection	2 mV/div. to 5 V/div.		
Main Time Base	50 ns/div. to 0.5 s/div.		
Delay Time Base	1 us to 5 s		
Main Trigger	Auto, Norm, TV-V, TV-H, Single		
Auto. Trigger	Yes	Yes	Yes
Cursors	No	Yes	Yes
Warranty	3 Years	3 Years	3 Years

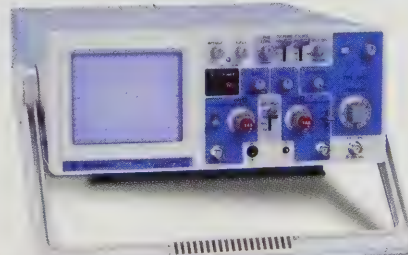
P/N	Description	1-3	4+
V-1560	100 MHz, 2 ch.	\$1695.00	\$1589.00
V-1565	100 MHz, 2 ch., with cursors	\$1795.00	\$1683.00
V-1585	100 MHz, 4 ch., with cursors	\$2195.00	\$2058.00

## B&K 25-MHz Dual-Trace Oscilloscope



This is the lowest price on a full-featured 25-MHz oscilloscope. It is a full-featured, bench/portable oscilloscope with 20 sweep rates, sum and difference capabilities for differential measurements, and a selectable trigger source.

- 1-mV/div. sensitivity • Auto/norm triggered sweep with AC, DC, TVH, and TVV coupling • X-Y operation • Front-panel trace and rotation control • Built-in calibration source • Variable trigger hold-off • Scale illumination



2120B

P/N	Description	List	Each
2120B	25-MHz oscilloscope	\$649.00	\$389.00

## LEADER 100-MHz 3-Channel Analog Oscilloscopes

- 100-MHz bandwidth • CRT readout of  $\Delta V$ ,  $\Delta T$ ,  $\Delta V\%$ ,  $\Delta T\%$ ,  $1/\Delta T$  and  $\emptyset$  (LS-8106 only) • Calibrated delayed sweep • Alternate sweep showings • Simultaneously display of main and delayed waveforms • 3-channel, 8-trace operation (ch. 1, ch. 2, ch. 3 and ch. 1  $\pm$  ch. 2) • Fixed trigger mode ensures stable triggering despite wide amplitude changes • Dedicated TV-H and TV-V sync. separators for positive, stable video triggering • Variable holdoff for display of complex wave trains • Single-sweep operation • X-Y operation • 1-mV/div. max. sensitivity with 20-MHz band limiting • 5-ns/div. time base with x10 • Signal delay line (all channels) ensures view of trigger edges • Ch.-1 output • Z-axis (intensity) modulation



LS-8106

P/N	Description	1-3	4+
LS-8105	100 MHz, 3 ch., dual time-base	\$1760.00	\$1656.00
LS-8106	100 MHz, 3 ch., CRT readout, cursors	\$1995.00	\$1894.00



Products with this symbol are some of our most popular and best priced.

## TEKTRONIX Current-Measurement System

The AM 503S is the most versatile current-measurement system available. Since the probes incorporate both a transformer and a HALL-effect device, broad-band AC/DC current can be measured simultaneously. Depending on the probe used, current from DC to 50 MHz and up to 700 A can be measured by clipping the split-core probes around the conductor. The AM 503S is a true system, consisting of an AM 503B current-probe amplifier, a TM 502A 2-wide power module, an A6302 current probe, and a handy plug-in toolbox.

- AC/DC measurements

### A6302 Probe

- DC to 50 MHz • 20-A continuous/50-A peak • Split core • Clips on to conductors up to .150" diam.

### A6303 Probe

- DC to 15 MHz • 100-A continuous/500-A peak • Split core • Clips on to conductors up to .830" diam.

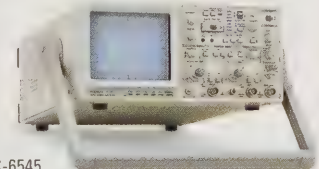


AM503S

P/N	Description	Each
AM503S	Current-probe system	\$3250.00
A6302	20-A current probe	895.00
A6303	100-A current probe	1795.00

## HITACHI™ Real-Time Storage Oscilloscopes

- These scopes offer analog and digital versatility for the professional or novice user • Can be used as both a real-time oscilloscope and a digital-storage oscilloscope • Capture "one shot" and intermittent phenomena • Low-speed signals (roll mode) • Averaging to reduce noise • Readouts and cursor measurements • Save memory • Expanded display (sine or linear interpolation) • RS-232C data transfer or plotter output



VC-6545

Features	VC-6545	VC-6645
VC-6645	Average, Roll Mode, Pre-Trigger, Trigger Lock, Save Waveform, Readouts, Cursors	
VC-6545	Sweep, Autoranging, Delayed Sweep, Auto Trigger	
Bandwidth	100	100
Input Channels	2	4
Max. Sampling Rate	40 MS/s	100 MS/s
Time Base	Main, Delay	
Sweep Speeds	50 ns-0.5 s/div.	
Record Length	4 K	4 K
Warranty	3 Years	

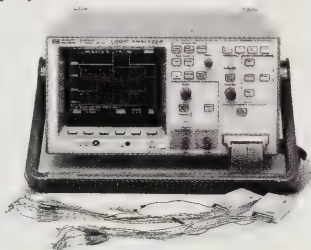
P/N	Description	1-3	4+
VC-6545	Real-time oscilloscope	\$2895.00	\$2714.00
VC-6645	Real-time oscilloscope	\$1115.00	\$796.00



## HEWLETT PACKARD Logic Analyzers

The HP 54620A/C represents a whole new way of looking at logic analysis—the essentials of timing analysis with the intuitive feel of a scope. 500 MS/s gives you the power to catch the nastiest glitches and the 1-button auto-scale instantly shows your results. The color display in the HP 54620C makes analysis even easier. Add the automatic measurement of frequency, period, duty cycle, width, delay, and hold time, and you're ready for any problem your digital circuits throw you.

And, with the HP 54620C's full-color active-matrix LCD, you can simplify your analysis even further by highlighting particular signals or grouping sets of signals by color. It all adds up to an easier and faster way to get the job done.



54620C/ABA

P/N	Description	Each
54620A/ABA	16-ch. logic analyzer	\$3095.00
54620C/ABA	16-ch. logic analyzer with color display	4095.00

Timing Channels	16 numbered 0–15 (all simultaneous)
Input R and C	Approximately 100 k $\Omega$ and 8 pF, minimum Input: 500 mV p-p about threshold
Max. Input	$\pm 40$ -V threshold range $\pm 6.0$ V
Time-Base Range (Main and Delayed)	5 ns/div.–1 s/div.
Time-Base Accuracy	0.01% of reading
Time-Base Cursor Accuracy	
Single Channel	$\pm$ (sample period +0.01% of reading +0.2% of screen width)
Dual Channel	$\pm$ (sample period +0.01% of reading +ch.-ch. skew +0.2% of screen width)
Maximum Sample Rate	500 MS/s
Record Length	2 k for sample period $\geq 8$ ns (sweep speeds of 1 $\mu$ s/div. to 1 s/div.), 8 k for all other sweep speeds, and when auto-glitch is disabled
Glitch Detect	Automatically activated when sampling period is slowed to be $> 4$ ns (1 $\mu$ s/div. and slower), min. detectable glitch: 3.5 ns
Triggering Sources	All channels and external
Auto/Normal Operation	
Auto Trigger	Free-running display if trigger not found
Normal	Analyzer waits indefinitely for trigger
Modes	Edge, pattern, advanced (2 pattern and edge terms); advanced operators: "and", "or", "then", "entered", "exited", "duration" ( $<$ ) "time", "occurs N times"
Setup Functions	Auto-scale, 16 saved setups, 2 trace memories, ch. labeler (75 preset and user-defined labels)
Interface	Compatible with HP 54650A and HP 54652B interface modules, and HP 34810B BENCHLINK scope software
Warranty	3 years

## HEWLETT PACKARD HP E2310A LogicDart Advanced-Logic Probe

If you'd like to think more about your circuits and less about your equipment, pick up this new advanced-logic probe. With this 1 hand-held tool, you can monitor logic activity, measure DC V, check frequencies, and even get timing diagrams with 10-ns resolution.

- Carrying case • Probe kit
- User guide • Name plate
- AC adapter and batteries
- Certificate of calibration

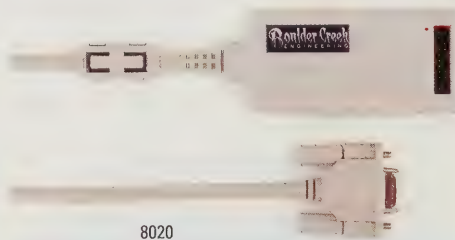


P/N	Description	Each
E2310A	LogicDart	\$795.00
E2320A	Assembled probe with browser	60.00
E2321A	Replacement probe	45.00
E2322A	Probe accessory kit	75.00

HP LogicDart Advanced-Logic Probe	
Logic Families	TTL, 5-V CMOS, 3.3-V CMOS, ECL, user 1, user 2
Logic Monitor	100 MS/s, $\geq 15$ -ns glitch detect, LEDs, beeper
Timing Analyzer	3 chs., 100 MS/s 2,048 samples/ch., pan and zoom 10 ns/div.–20 s/div.
Triggering	Edge, pattern, edge/pattern combination $\geq 15$ -ns trigger glitch detect
DC Voltage	$\pm 35$ V (3-1/2 digits), $\pm$ (0.5% of reading + 2 counts)
Frequency	1 Hz–33.0 MHz
Resistance	0.01 k $\Omega$ –200 k $\Omega$
Continuity Threshold	80 $\Omega$ min., 140 $\Omega$ typical

## BOULDER CREEK POD-A-LYZER™

POD-A-LYZER logic analyzers connect to your PC and provide an intuitive WINDOWS user interface. The software is license-free, so everyone can analyze data on their own PC. Two models are available, covering general-purpose hardware timing as well as software trace applications.



8020

	Pod-8020	Pod-8040
Timing	18 Channels @ 100 MHz	32 Channels @ 200 MHz
State	18 Channels @ 66 MHz	48 Channels @ 100 MHz
Memory	64 KB per Channel	128 KB per Channel
PC Interface	RS-232	RS-232 and USB
O/S	WINDOWS 3.2, 95, NT	WINDOWS 95, NT
S/W Trace	N/A	68HC11, 8051
EJTAG Port	N/A	Yes

P/N	Description	Each
8020	100-MHz POD-A-LYZER	\$1295.00
8040	200-MHz POD-A-LYZER	2495.00
TCA-8020A	Replacement target cable assembly	125.00



We are a full-service distributor with a broad range of the best products.

## GLOBAL SPECIALTIES® 32-Channel Logic Analyzer

The GA320S is a high-performance, low-cost, portable logic analyzer for development, production, and field-service applications.

- 3-yr. warranty • 32 data channels from DC up to 25 MHz • RS-232 standard interface • 100-MHz maximum acquisition speed • 5-ns glitch capture
- 4-step multilevel trigger sequencing with delay and restart • Multiple clocks for complex synchronous capture • A variety of disassemblers available for many popular microprocessors • Non-volatile data and set-up memories • Operation: 120 V AC @ 60 Hz or 220 V AC @ 50 Hz

### Data and Clock Pods

The high-speed AP03 data pod provides 16 data inputs without glitch capture or 8 data inputs with glitch capture at clock frequencies up to 25 MHz, or 4 data inputs at 100 MHz (asynchronous only). Two AP03 data pods are needed for the GA320S along with an AP04 clock pod for synchronous data acquisition. The AP04 provides 3 clocks and 3 qualifiers at up to 25 MHz. The AP03 and AP04 input thresholds are fixed (TTL).

105-0320



P/N	Description	1-4	5+
105-0320	GA320S logic analyzer	\$1650.00	\$1510.00
105-0323	AP03 high-speed data pod (2 required per unit)	\$290.00	—
105-0324	AP04 clock pod	150.00	—
105-0325	Logic grabber (in packs of 5 or 10)	56.00	—
105-0326	PC link	325.00	—

## HITACHI Logic Analyzers

- 32- or 48-channel logic analyzers • DC to 25 MHz with memory depth of a full 8 K on all 32 or 48 channels • 100-MHz asynchronous acquisition
- 5-ns glitch capture • Multiple clocks • Multi-level triggering • Nonvolatile data and setup memories • Powerful search and compare capabilities • Easy-to-use test pods • VC-3130 (only) • Signature analysis (go/no go)
- Analog display mode
- Disassembler options for 8-bit and 16-bit microprocessors



VC-3130

P/N	Description	1-4	5+
VC-3120	Logic analyzer, 32 ch.	\$2100.00	\$2025.00
VC-3130	Logic analyzer, 48 ch.	2837.00	2740.00
AP01	Combination pod, 32 ch. (DC to 25 MHz), 3 clock inputs	521.00	—
AP02	Combination pod, 48 ch. (DC to 25 MHz), 3 clock inputs	626.00	—
AP03V	High-speed data pod, 16 ch./50 MHz or 8 ch./50 MHz or 4 ch./100 MHz, variable threshold	626.00	—
AP04V	Clock pod, 3 clock inputs, 3 clock qualifiers	468.00	—



## TEKTRONIX Passive-Voltage Probes

### B-Series Passive Voltage Probes

Passive voltage probes are the most commonly used oscilloscope probes. Other specialty probes expand the range and functionality of an oscilloscope as a measurement system, but a general-purpose, passive-voltage probe is the working end of the oscilloscope, a tool used and abused every day without concern by engineers and technicians.

- Single-piece molded-rubber body • Lightweight ergonomic design • High durability • HYBRID/SMT circuitry on multi-layer circuit board for improved performance and reliability • UL safety certification • 1-year unconditional guarantee

### Modular Probes

TEKTRONIX modular probes are designed to save you money in repair and maintenance over the life of the probe. The three modules (probe head, cable, and connector) quickly snap or screw together, eliminating the need for soldering. Spare modules can be ordered and stocked, reducing down-time and eliminating the need to send a probe in for repairs.

### Modular Subminiature Probes

The compact probe-head/tip assembly is compatible with the full line of compact accessories. When the subminiature/compact-to-miniature probe-tip adapter (013-0202-02) is installed over the probe head/tip, the P6131, P6133, P6136, P6137, and P6138A probes are fully compatible with all miniature tip accessories readout encoding, as well as a full complement of attachment accessories.



P/N	Description	Each
<b>B-Series Probes</b>		
P6101B	1x, 15 MHz, without readout	\$65.00
P6103B	10x, 60 MHz, without readout	75.00
P6109B	10x, 100 MHz, with readout	95.00
P6111B	10x, 200 MHz, with readout	150.00
P6114B	10x, 400 MHz, with readout	185.00
P6119B	1x/10x, 10 MHz/100 MHz, without readout	110.00
P6129B	1x/10x, 10 MHz/100 MHz, without readout	140.00
<b>Modular Subminiature/Compact Probes</b>		
P6131	10x, 300 MHz, with readout	235.00
P6133	10x, 150 MHz, with readout	199.00
P6136	10x, 350 MHz, without readout	235.00
P6137	10x, 400 MHz, with readout	285.00
P6138A	10x, 350 MHz, with readout	230.00
<b>Modular Probes</b>		
P6105A	10x, 100 MHz, with readout	210.00
P6106A	10x, 250 MHz, with readout	250.00
P6122	10x, 100 MHz, without readout	150.00

## TEKTRONIX High-Voltage Probe

- High voltage: 20-kV DC/40-kC peak (100-ms pulse width) • High bandwidth: 75 MHz • Silicone dielectric • Optional 1,000x coding • Wide compensation range (7 pF–49 pF) • Heavy-duty versatile ground lead and clip

The P6009 is a low-input capacitance, high-voltage (1.5 kV) probe designed for higher-performance measurements. The probe can be compensated to match nominal input capacitance of 8 pF to 49 pF with input resistance of 10 MW.



P/N	Description	Each
P6015A	100x, 10-ft high-voltage probe	\$1125.00

## TEKTRONIX Surface-Mount Probes

While instrumentation improvements provide a steady stream of digital troubleshooting tools, the physical challenges associated with probing small-geometry ICs have not been addressed until now.

The basic contact of the SMD-probe family is a 25-mil socket that accepts square or round pins. A variety of tip adapters permit convenient non-destructive, temporary connection to the most popular EIAJ and JEDEC surface-mount packages.

Each SMD probe is designed to minimize capacitive loading on TTL, ECL, CMOS, Fast-CMOS and BiCMOS circuits. The probe and oscilloscope form a measurement system that is optimized for circuit designers by providing fast transient response, high system bandwidth, and low capacitive circuit loading.

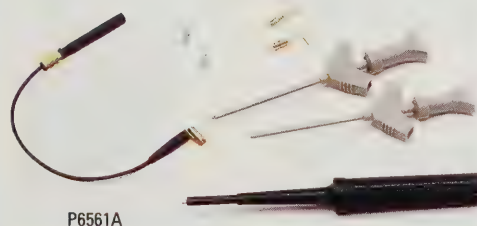
The P6561A and P6562A are scaled for surface-mount IC packages. Their low-mass probe bodies are only 1.5" long and 100-mil wide. Bundled in sets to match the oscilloscope's performance and channel count, these probes provide solutions for the most popular EIAJ and JEDEC surface-mount packages.

### SMD Package Support

- 50-mil SO/SOIC • 50-mil QUAD • 25-mil JEDEC • .65-mil EIAJ • .5-mm EIAJ

### Circuit Compatibility

- CMOS • BiCMOS • Fast-CMOS • TTL • ECL



P/N	Description	Each
P6561A	SMD probe for TDS 300, TAS 400 series	\$239.00
P6562A	SMD probe for TDS 400, 2400, and 11,000 series	269.00

## ITT POMONA Oscilloscope Probe

- Bandwidth: X1 position DC to 15 MHz, X10 position DC to greater than 150 MHz • Replaceable tip



P/N	Description	List	Each
SP150B	Oscilloscope probe	\$59.00	\$40.00

## PROBE MASTER Heavy-Duty Scope Probe

This probe features a snap-on rotating ground lead and a heavy-duty fixed tip. Accessories include the following: sprung hook, 6" ground lead, trimmer tool, and storage pouch.

- 100-MHz bandwidth • Rugged fixed tip • Rotating ground lead



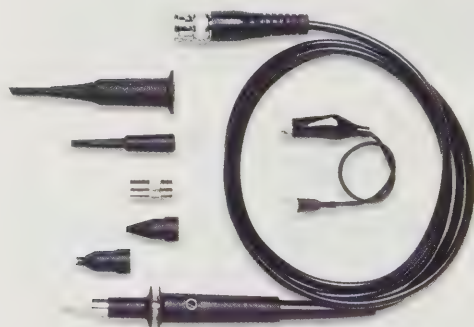
P/N	Description	Each
3901-2	1x/10x, 100-MHz probe	\$29.00
3904-2	10x, 100-MHz probe	27.00





## ITT POMONA Passive Oscilloscope Probes

These general-purpose oscilloscope probes feature high performance for greater test flexibility—complete accessory kit included.



P/N	Attenuation	System Bandwidth (-3 dB) MHz	System Rise Time ns	System Input Resistance* MΩ	Capacitance* pF	Compensation Range pF	Readout Actuator	Ground Reference	Each
5800A	x1	30	11.66	1	57	NA			\$45.00
6265	x10	60	5.83	10	10.5	10-60			30.00
6266	x1/x10	20/60	17.5/5.83	1/10	65/11	NA/10-60		•	32.00
5795A	x10	100	3.5	10	9.5	10-60			38.50
4550B	x1/x10	15/100	23.33/3.5	1/10	64/10.5	NA/10-60		•	47.00
6049A	x10	150	2.33	10	10.5	10-30			39.60
6101A	x10	150	2.33	10	10.5	10-30		•	47.00
5803A	x10	200	1.75	10	10	10-60			50.00
5806A	x1/x10	20/200	17.5/1.75	1/10	77/11.5	NA/10-60		•	54.00
5827A	x100	200	1.75	10	5.5	15-50			88.00
6069A	x10	250	1.4	10	10	10-30			50.00
6102A	x10	250	1.4	10	10	10-30		•	54.00
5809A	x10	300	1.17	10	17	10-60			87.00
5812A	x10	300	1.17	10	17	10-60		•	92.00

\*Measurements based on 1-MΩ, 20-pF oscilloscope.

## ITT POMONA DIP Test Clips

POMONA DIP test clips provide fast, reliable, and safe connections to socketed and through-hole DIP chips. Available in 2 styles, DIP test clips give you the option of full coverage of clip contacts for maximum safety or open leads at the board level for easier access to chip leads.



3916A



P/N	No. of Leads	Chip Width	Contact Style	Contact Material	Each
5108	8	0.3"	Closed	Gold plate	\$7.95
5014	14	0.3"	Closed	Nickel silver	7.60
3916A	16	0.3"	Closed	Nickel silver	6.85
5120	20	0.3"	Closed	Gold plate	11.55
4124A	24	0.6"	Closed	Nickel silver	15.00
4140A	40	0.6"	Closed	Nickel silver	21.95

## 3M Test Clips for DIPs and PLCCs

### DIP Surface-Mount Test Clips

For troubleshooting DIPs safely and quickly, test clips allow for easy attachment on high-density boards. The test clips shown are standard-lead with nail heads.

P/N	Description	Each
TC-8-923695-I	8-pin test clip	\$8.15
TC-14-923698-I	14-pin test clip	8.20
TC-16-923700-I	16-pin test clip	8.35
TC-18-923703-I	18-pin test clip	12.95
TC-20-923704-I	20-pin test clip	13.70
TC-22-923705-I	22-pin test clip	17.70
TC-24-923714-I	24-pin test clip	18.75
TC-28-923718-I	28-pin test clip	23.10
TC-36-923720-I	36-pin test clip	25.95
TC-40-923722-I	40-pin test clip	27.40
TC-48-923724-I	48-pin test clip	37.55
TC-64-923726-I	84-pin test clip	43.30

## PLCC Surface-Mount Test Clips

These test clips allow convenient testing of plastic-leaded chip carriers of surface-mount ICs. Industry standard 0.025" square contact pins with helical compression springs to make positive contact during testing.



P/N	Description	Each
TC-20-923670-I	20-pin PLCC test clip, alloy	\$31.50
TC-28-923670-I	28-pin PLCC test clip, alloy	33.60
TC-44-923670-I	44-pin PLCC test clip, alloy	43.45
TC-68-923670-I	68-pin PLCC test clip, alloy	50.50
TC-84-923670-I	84-pin PLCC test clip, alloy	54.50
TC-20-923675-I	20-pin PLCC test clip, gold	35.05
TC-28-923675-I	28-pin PLCC test clip, gold	42.05
TC-44-923675-I	44-pin PLCC test clip, gold	46.80
TC-68-923675-I	68-pin PLCC test clip, gold	55.70
TC-84-923675-I	84-pin PLCC test clip, gold	60.20

## ITT POMONA PLCC Test Clips

POMONA's low-cost QUAD CLIP® test clips quickly lock onto J-leaded PLCCs, providing easy access for testing surface-mounted devices. PLCC test clips attach to PLCC chips with a sliding cam that clamps onto the chip body. Access to chip leads is provided by .025" top-side pins at .100" spacing. POMONA offers a QUAD CLIP test clip to fit all currently available PLCC chip sizes.

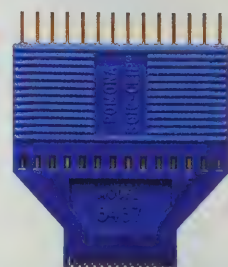


5401

P/N	No. of Leads	Lead Pattern	Body Size	Each
5280	28	7 x 7	.46" x .46"	\$31.90
5733	32	7 x 9	.46" x .56"	33.50
5281	44	11 x 11	.63" x .63"	37.50
5401	68	17 x 17	.95" x .95"	50.00

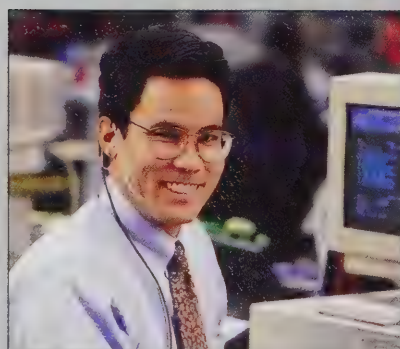
## ITT POMONA SOIC/SOJ CLIP® Test Clips

SOIC/SOJ CLIP test clips feature a narrow-profile design that makes testing SOIC and SOJ chips on densely-populated boards easier and safer.



5437

P/N	No. of Leads	Lower Width (A)	Body Widths	Top Width (B)	Each
5250	8	0.260"	0.15"-0.3"	0.430"	\$8.00
5251	14	0.410"	0.15"-0.3"	0.755"	8.75
5252	16	0.460"	0.15"-0.3"	0.830"	9.50
5253	20	0.560"	0.15"-0.3"	1.030"	10.95
5437	28	0.760"	0.15"-0.3"	1.430"	19.50



Help is Just a  
Phone Call Away



# B&K Function Generators

This is a line of high-performance function and sweep/function generators. These are rugged lab-grade instruments that are capable of satisfying a variety of engineering, testing, and service needs. Each unit is engineered for high reliability and user-operating convenience.

Compare features, performance, and quality of construction with any other generators in their price class, and you'll see that B&K function generators are your best buy.

Sweep/Function				
Model	4040	4017	4011	4010
Frequency Range	0.2 Hz to 20 MHz	0.1 Hz to 10 MHz	0.5 Hz to 5 MHz	0.2 Hz to 2 MHz
Coarse and Fine Tuning	•	•	•	
Waveforms				
Sine	•	•	•	•
Square	•	•	•	•
Triangle	•	•	•	•
TTL Output	•	•	•	•
CMOS Output	•	•	•	•
Pulse and Ramp	•	•	•	•
Tone Burst	Int./ext.			
AM	Int./ext.			
FM	Int./ext.	Ext.	Ext.	Ext.
Sine-Wave Distortion	1%	1.0%	1.0%	1.0%
Variable Symmetry	15:85:15	15:85:15	15:85:15	15:85:15
Ext. Sweep/Mod. Input	0 V–10 V	0 V–10 V	0 V–10 V	0 V–10 V
Counter Digits	5	5	4	
Ext. Freq. Counter	•	•	•	
DC Offset	•	•	•	•
Sweep				
Lin.	100:1	100:1	100:1 (ext.)	100:1 (ext.)
Log	100:1	100:1	100:1 (ext.)	100:1 (ext.)
Sweep Time (Max.)	30 s	30 s		
Sweep Output	0 V–2 V	0 V–10 V		

## Model 4040

- 0.2 Hz–20 MHz • AM and FM modulation • Burst operation • External frequency counter to 30 MHz • 5-digit LED display • All features of Model 4017

## Model 4017

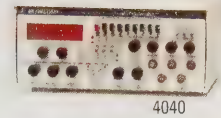
- 0.1 Hz–10 MHz • Linear and log. sweep • 5-digit LED display • All features of Model 4011

## Model 4011

- 0.5 Hz–5 MHz • Sine, square, triangle, pulse, and ramp output • Coarse and fine tuning • 4-digit LED display • Variable duty cycle • Variable DCm offset

## Model 4010

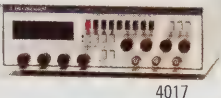
- 0.2 Hz–2 MHz • Sine, square, triangle, pulse, and ramp output • Variable duty cycle • Variable DC offset



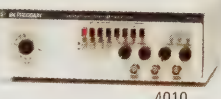
4040



4017



4011



4010

P/N	Description	1-4	5+
4040	20 MHz sweep/function generator with frequency counter	\$499.00	\$465.50
4017	10 MHz sweep/function generator with digital display	369.00	344.00
4011	5 MHz function generator with digital display	284.00	265.50
4010	2 MHz function generator	229.00	213.25

## From the bench

### FUNCTION GENERATORS

Courtesy of B&K

Function generators are one of the most important and versatile pieces of test equipment that a technician or engineer can use. In both design and troubleshooting, the circuit in question often requires a signal to simulate its normal operation. The specific type of

signal can vary widely from one circuit to another. Modern function generators can produce a very wide variety of these signals, to meet the vast majority of a user's requirements. Even today's most basic units are capable of sine, square, and triangle outputs over a range of frequencies from less than 1 Hz to at least 1 MHz, with variable amplitude and adjustable DC offset. Many generators include extra features such as higher frequency capability, variable symmetry, frequency sweep, AM and FM operation, and gated burst mode.

## LEADER 2-MHz Function Generator

The LG-1301 is a general-purpose signal source that can be used for a broad range of research, design, education, and service applications.

- Frequency range: 0.002 Hz–2 MHz • Output level is variable from 20 V p-p to 1 mV p-p
- Output waveforms include: sine, triangle, square fixed ramps at 15:85 and 85:15, and pulse with adjustable symmetry over a 9:1 to 1:9 range • Output-level attenuation to 70 dB with continuous adjustments between steps



LG-1301

P/N	Description	1-4	5+
LG-1301	2-MHz function generator	\$395.00	\$368.00

## LEADER 10-MHz Function Generator

The LG-1311 is a feature-packed sweep/function generator designed for a variety of research and development, service, design, and education applications.

- 5 operating modes: CW, trigger, gate, burst, and lin./log. sweep • Adjustable symmetry, 9:1 to 1:9, is available for all output waveforms which include sine, triangle, and square • Rear-panel BNC connectors are available for sweep, sync., GCV output, AM modulation, and VCG input



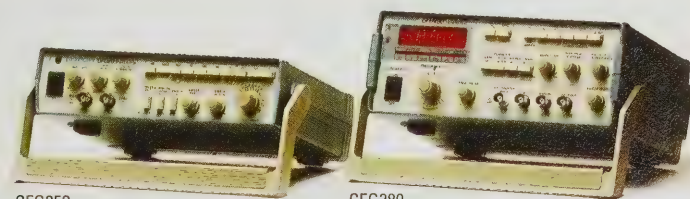
LG-1311

P/N	Description	1-4	5+
LG-1311	10-MHz function generator	\$745.00	\$645.00

## TEKTRONIX Function Generators with Counters

Applications for the CFG253 include testing and calibration of audio, ultrasonic, and servo systems. The CFG253 sweep function can be controlled internally or with an external DC-signal level. Duty cycle, DC offset, sweep rate, sweep width, and amplitude are user-controllable.

The CFG280 combines an 11-MHz function generator—which produces sine, square, and triangle waves, plus TTL signals—with a 100-MHz frequency counter. The on-board counter allows the operator to precisely set the frequency output of the function generator. By combining the two capabilities, this versatile instrument conserves on both bench-top space and expense.

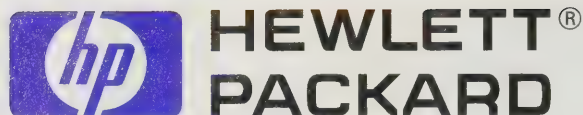


CFG253

CFG280

P/N	Description	1-4	5+
CFG280	11-MHz function generator with counter	\$1030.00	\$991.00
CFG253	3-MHz function generator	420.00	399.00





## HEWLETT PACKARD HP 33120A Function/Arbitrary-Waveform Generator

The HP 33120A offers you the rock-solid stability of digital synthesis at a very low price. And, you get full programmability by using SCPI (Standard Commands for Programmable Instruments) and the standard HP-IB or RS-232 interface.

The Option 001 phase lock/time base increases the HP 33120's frequency stability and creates new system possibilities. Generate precise phase-offset signals, phase lock a pair of HP 33120As, sync. your generator to a 10-MHz frequency standard, or tie an entire ATE system to a master clock.

- 10 standard waveforms with sine and square to 15 MHz
- Build arbitrary waveforms with 40-MS/s speed and storage for (4) 16,000-pt. waveforms
- Clean signals (THD less than 0.04% and flatness as low as  $\pm 0.1$  dB)



33120A

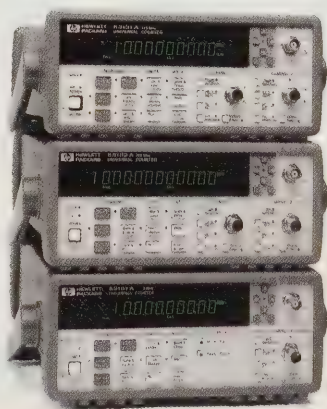
P/N	Description	Each
33120A	Function/arbitrary-waveform generator	\$1795.00
33120A/001/ABA	Generator with OPT 001 phase lock/TCXO time base	2198.00
<b>Accessories</b>		
5063-9240	Rack-mount kit	60.00
34161A	Accessory pouch	40.00
34811A/ABA	BENCHLINK meter software	300.00

## HEWLETT PACKARD HP 53100A Series Counters

The HP 53100A Series counters use real-time digital processing to analyze data while simultaneously taking new readings. So while other counters are stuck in processing (dead time), these counters have already moved on to the next measurement. And with continuous HP-IB data-transfer rates of more than 200 measurements per second, you get the job done in a hurry.

These counters simplify your work with automated limit tests, instant recall of test setups, and 1-button access to the features you need most. Plus, they allow you to do a statistical analysis of all measurements while you simultaneously measure and track: average, min./max., and standard deviation.

- Operator's manual 53131A/ABA
- Power cord 53132A/ABA
- Programming manual 53181A/ABA



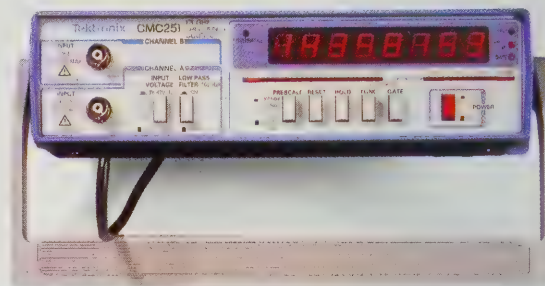
P/N	Description	Each
53131A/ABA	225-MHz universal counter, 10 digits/s	\$1725.00
53131A/030/ABA	53131A with 3-GHz ch. 3 with BNC connector	2525.00
53132A/ABA	225-MHz universal counter, 12-digits/s	2595.00
53132A/010/ABA	53132A counter with high-stability time base	3495.00
53132A/010/030/ABA	53132A/010 with 3-GHz ch. 3 with BNC connector	4295.00
53181A/ABA	225-MHz RF counter, 10 digits/s	1575.00
53181A/015/ABA	53181A with 1.5-GHz ch. 2 with BNC connector	2075.00
34812A/ABA	BENCHLINK meter software for WINDOWS	300.00
5063-9240	Rack-mount kit	60.00

## Multifunction counters for use in high-frequency systems

### TEKTRONIX Counters CMC251

A 1.3-GHz multifunction counter that measures the frequency of sine, square, and triangle waves from 1 Hz to 1.3 GHz.

- 1 Hz-100 MHz (ch. 1), 80 MHz-1.3 GHz (ch. 2) •  $\pm 1$ -ppm time base
- Period average, period, frequency, totalize, and self-test
- Display hold
- Remote start/stop



CMC251

P/N	Description	1-4	5+
CMC251	1.3-GHz frequency counter with high-stability time base	\$620.00	\$596.00

### LEADER Frequency Counters

Both the LF-826 and LF-827 have measuring modes for frequency, period, RPM, and totalize. The calculation functions operable in all modes except totalize include a 3-level comparator with "HI", "LO", and "GO" LED indicators and a relative mode. High-speed reciprocal measurement is included to give you accurate high-resolution readings at low frequencies. Input "A" has auto triggering to set both the trigger and hysteresis levels to minimize errors from noisy signals. The manual trigger combinations include: LPF, AC or DC coupling with an adjustable trigger-level control. A switchable low-pass filter reduces RF noise levels before counting.



LF-826



LF-827

Features	LF-826	LF-827
Frequency Range (Bandwidth)	0.1 Hz-500 MHz	0.1 Hz-1.3 GHz
Sensitivity		
Input A	15 mV RMS or 150 mV RMS	
Input B	10 mV RMS	
Max. Input Voltage		
Input A	100 V RMS (400 Hz)	
Input B	5 V RMS	
Impedance		
Input A	1 M $\Omega$ (approx.)	
Input B	50 $\Omega$ (approx.)	
Time Base	10 MHz, Crystal Controlled	

P/N	Description	1-4	5+
LF-826	500-MHz frequency counter	\$495.00	\$449.00
LF-827	1.3-GHz frequency counter	645.00	600.00



## Multifunction counters for a broad spectrum of applications

### B&K Multifunction Counters

B&K counters provide versatility and reliability for a broad spectrum of laboratory and service applications. In addition to frequency measurements, most B&K counters also provide period and totalize measurement capabilities.

Each counter is built for continued high accuracy over a wide range of operating conditions. Each unit features high-contrast displays and non-glare viewing screens. B&K counters also feature a selectable low-pass filter to screen out high-frequency noise from low-frequency measurements.

Compare our features, performance, price, and company reputation with any other counter, and you'll choose B&K.

#### Model 1856B 2.4-GHz

- Frequency, period, min., max., and relative functions • Selectable resolution
- 8-digit LED display • Display hold • RS-232 output
- 0.5-ppm TCXO time base

#### Model 1823 175-MHz Universal

- 5 Hz–175 MHz • Frequency, period, period average, totalize, frequency ratio, and time interval
- 8-digit LED display • 10-ppm time base, 0 °C to 50 °C
- Trigger level and slope switch signal controls • Display-hold and reset features • External time-base input



1856B

P/N	Description	1-4	5+
1856B	2.4-GHz multifunction counter	\$499.00	\$465.00
1823	175-MHz universal counter	399.00	372.00

### B&K Hand-Held Portable Frequency Counters

Introducing the new hand-held frequency counters from B&K. These battery-powered units are ideal for labs, field research, and service.



1870

1875

	1870	1875
Display	.5" LCD, 8 Digits	
Measurement	Frequency, Data Hold, Relative, Min./Max., Average, Period	
Frequency Range	1.25 GHz	2.5 GHz
Range	50 MHz–1,200 MHz 10 MHz–500 MHz	50 MHz–2,500 MHz 10 MHz–500 MHz
Over Voltage Input	2,500-MHz and 500-MHz Input: 5 V p-p 10 MHz and Period: 250 V p-p	

P/N	Description	1-4	5+
1870	1.25-GHz frequency counter	\$209.00	\$197.00
1875	2.5-GHz frequency counter	249.00	234.00

### GLOBAL SPECIALTIES 1.3-GHz Hand-Held Frequency Counter



The Model 5003 is a very compact, battery-powered frequency counter that offers bench-top performance and the convenience of a hand-held multimeter. It incorporates an 8-digit LCD of the size found on bench-top instruments and it includes a full range of indicators that display measurement function, measurement time, overflow, trigger activity, low battery, and measurement units.

- Measures frequencies from 5 Hz to 1,300 MHz
- Yields at least 7 digits of resolution per second of measurement and measures low frequencies to 0.0001 MHz • Displays signals in tenths of a period as an alternative to frequencies to 25 MHz • Hold-button allows readings to be frozen on the display for measuring non-continuous signals or recording results later.



105-5003

P/N	Description	1-4	5+
105-5003	Hand-held frequency counter	\$250.00	\$237.00
111-0110	Carrying case	23.00	—

### GLOBAL SPECIALTIES PROTO-BOARDS®

The PB-503 and PB-503C PROTO-BOARDS are complete design workstations, including instruments, breadboarding, and a rugged DC-regulated triple power supply. The instruments include a 100-kHz function generator with sine, square, and triangle waveforms, plus a TTL output for generating clock pulses. Also standard are 2 digital pulsers operated by debounced push-button switches and 8 logic-state indicators which operate as individual logic probes.

The breadboarding area has a total of 2,520 uncommitted tie points, enough space for circuits containing 24 ICs of 14 pins each or the equivalent. The power supply offers 3 DC-regulated supplies: 1 fixed at 5 V DC and 2 variable from 1.3 V DC to 15 V DC. All 3 supplies are short-circuit protected, automatically current limiting the output to a safe level.

The PB-503C is a complete electronics workstation housed in a rugged carrying case.

- Unconditional lifetime guarantee on all breadboarding sockets and a 3-yr. warranty on all parts and workmanship • 8-ch. logic monitor • Audio experimentation speaker



104-5030

104-5031

P/N	Description	1-4	5+
104-5030	PB503 desktop workstation	\$299.95	\$279.00
104-5031	PB503C portable workstation with carrying case	349.95	331.00



## Clean power that won't clean out your budget

### HEWLETT PACKARD HP 3600 Series DC Power Supplies

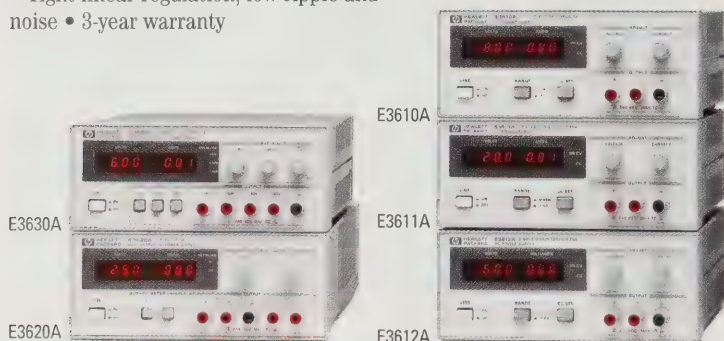
These power supplies give you clean power with dependable regulation and fast transient response. They also turn on and off without overshoot, so you get precise output from start to finish.

Choose the constant-voltage (CV) mode or constant-current (CC) mode. In CV mode, it's easy to set a safe current level for every test. In the HP E3610/11/12A, CV/CC modes let you preset both current and voltage limits so you can be sure your circuits are getting the levels you think they are.

The HP E3614/15/16/17A give you even more peace of mind. Adjustable overvoltage protection makes it easy to keep the circuits out of harm's way. These power supplies also use remote sensing to measure voltage at the load and automatically compensate for voltage drops, so you can count on unsurpassed accuracy.

The HP E3620A has a pair of 25-V (1-A) outputs (the outputs are completely isolated and independent). The HP E3630A has a pair of  $\pm 20$ -V (0.5-A) outputs and a 6-V (2.5-A) output.

- 9 models, up to 120 V, 6 A • Constant-current and constant-voltage modes
- Tight linear regulation, low ripple and noise • 3-year warranty



P/N	Description	Each
E3610A	8-V/3-A or 15-V/2-A single-output DC power supply	\$310.00
E3611A	20-V/1.5-A or 35-V/0.85-A single-output DC power supply	310.00
E3612A	60-V/0.5-A or 120-V/0.25-A single-output DC power supply	310.00
E3614A	8-V/6-A single-output DC power supply	525.00
E3615A	20-V/3-A single-output DC power supply	525.00
E3616A	35-V/1.7-A single-output DC power supply	525.00
E3617A	60-V/1-A single-output DC power supply	525.00
E3620A	25-V/1-A dual-output DC power supply	525.00
E3630A	Triple-output DC power supply	525.00

### LEADER Digital DC Power Supplies

- 3-1/2-digit LED display • Accuracy:  $\pm 0.5\%$  rdg,  $\pm 2$  digits •  $\leq 1$  mV RMS ripple and noise • Constant voltage and current operation • Overload and reverse polarity protection • Series- and parallel-operation modes



P/N	Description	1-4	5+
718-3D	18-V, 3-A power supply	\$345.00	\$319.00
718-5D	18-V, 5-A power supply	365.00	339.00
730-3D	30-V, 3-A power supply	385.00	357.00
735-10D	35-V, 10-A power supply	1045.00	969.00

## Power supplies for a broad range of laboratory and service applications

### B&K Single-Output DC Power Supplies

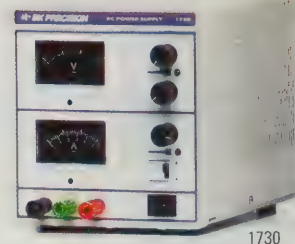
These power supplies provide the versatility and reliability required for use in engineering, industrial service shops, labs, and school applications. All B&K power supplies are short-circuit protected for dependability. Compare features, performance, price, and company reputation with any other power supply and you'll choose B&K.

#### Model 1730

- New compact style • Operates continuously at full load without overheating
- Fully overload protected • Coarse, fine voltage controls • 2-year warranty

#### Model 1735

- Excellent regulation • Very low ripple • Constant-voltage or constant-current operation • Continuously monitors voltage and current output on 2 meters • 2-year warranty



Single Output DC Power Supplies			
Features			
Model	1710	1730	1735
Output Voltage	0 V–30 V	0 V–30 V	0 V–30 V
Output Current	0 A–1 A	0 A–3 A	0 A–3 A
Metering			
Type	Analog	Analog	3-digit LED
Voltmeter Range	0 V–32 V	0 V–32 V	0 V–99.9 V (green)
Voltmeter Accuracy	$\pm 2.5\%$	$\pm 2.5\%$	$\pm (0.5\% \text{ rdg.} + 2 \text{ digits})$
Ammeter Range			
High Range	0 A–1.04 A	0 A–3.2 A	0 A–9.99 A (red)
Low Range	0 A–0.26 A	0 A–0.53 A	
Ammeter Accuracy	$\pm 2.5\%$	$\pm 2.5\%$	$\pm (0.5\% \text{ rdg.} + 2 \text{ digits})$

P/N	Description	1-4	5+
1710	30-V, 1-A analog power supply	\$229.00	\$213.50
1730	30-V, 3-A analog power supply	315.00	295.00
1735	30-V, 3-A digital power supply	380.00	355.00

### TEKTRONIX Power Supply

The PS280 laboratory DC power supply serves as a multifunction bench-top or portable instrument.

- Fixed 5-V, 3-A supply • 2 variable outputs, 0 V–30 V, 2 A • Variable current limiting • Selectable independent tracking mode • Dual-tracking, variable, 0 V–30 V, 2 A



P/N	Description	1-4	5+
PS280	30-V, 2-A power supply	\$725.00	\$698.00



## B&K Triple-Output DC Power Supply

- 0 V–30 V DC (2), 2-A sections capable of independent, series, or parallel operation • 4 V–6.5 V DC, 5-A section • Switchable series/parallel operation—30-V sections • Adjustable current-limit controls—30-V sections • 3-digit LED displays (2): 1 reads volts or amps of "B" supply; 1 reads volts or amps of "A" supply or 4 V–6.5-V supply • Unique variable tracking, B track A at 5% to 100% • 2-year warranty



1760

P/N	Description	1-4	5+
1760	Triple-output DC power supply	\$649.00	\$606.00

## B&K High-Current DC Power Supplies

- Output: 3 V–14 V DC • Reverse-polarity protection • Overload protection • Short-circuit protection • Current limiting • Operates continuously at maximum output without overheating



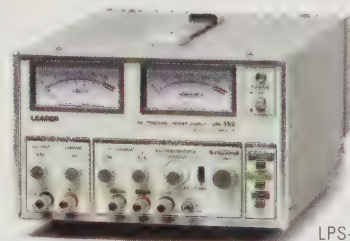
1686

P/N	Description	1-4	5+
1686	Power supply, 12 A DC	\$199.00	\$185.50
1688	Power supply, 25 A DC	299.00	279.00

## LEADER Triple-Output DC Power Supply

This  $\pm 25$ -V source can be used in combination for voltage tracking when set at different output levels to provide a means of voltage-ratio tracking using the  $\pm 25$ -V source voltage as the reference voltage.

- Auto-tracking • Metered output • <3-mV p-p ripple • Current limited with automatic recovery



LPS-152A

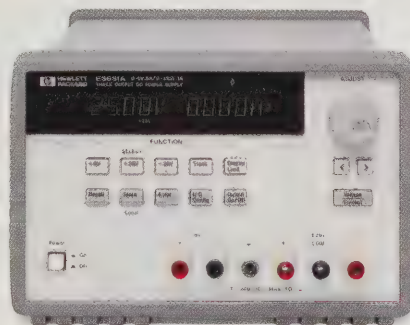
P/N	Description	1-4	5+
LPS-152A	Triple-output DC power supply	\$675.00	\$625.00

## HEWLETT PACKARD HP E3631A Triple-Output DC Power Supply

This stand-alone bench-top power supply lets you quickly set exact output levels with its dual voltage and current meters. Its 6-V power supply is completely isolated from its dual 25-V supplies, which you can track together, operate independently, or operate as a single 50-V supply.

Connect the HP E3631A to a PC or other controller via its built-in HP-IB or RS-232 port, and you have a versatile power source for automated testing.

- 3 DC outputs with 80 W total power • DC outputs: (1st) 0 V to +25 V, 0 A to 1 A; (2nd) 0 V to -25 V, 0 A to 1 A; (3rd) 0 V to 6 V, 0 A to 5 A • Clean, stable output signals; linear regulation • 3-year warranty



E3631A

P/N	Description	Each
E3631A	Triple-output DC power supply	\$995.00

## HEWLETT PACKARD HP E3632A Single-Output, Dual-Range DC Power Supply

When your application calls for a power supply with muscle, choose the HP E3632A. This dual-range, programmable DC power supply really delivers the power—a full 120 W—with low noise and accurate regulation.

Load and line regulation to less than 0.01% keep the output steady. Its low normal-mode noise ensures clean power for precision circuitry and low common-mode current noise provides isolation from power-line current injection.

HP-IB and RS-232 interfaces are standard, so you can use this power supply with any computer that has an IEEE 488 or RS-232 interface.

- High-output, 120 W • Dual range: 0 V–15 V, 7 A; 0 V–30 V, 4 A • Linear regulation for low noise High accuracy and high resolution • HP-IB and RS-232 interfaces • 3-year warranty

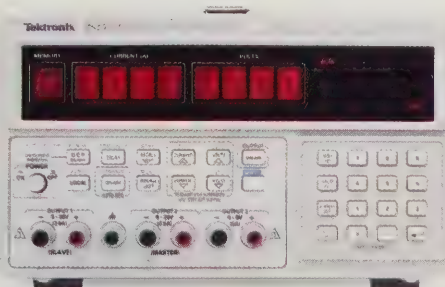
P/N	Description	Each
E3632A	Single-output, dual-range DC power supply	\$995.00

## TEKTRONIX Programmable Bench-Top Power Supplies

These power supplies feature 100 memories to store voltage and current limits for instant recall via the front panel or GPIB. They can be operated in 1 of 3 modes: independent, series, or parallel.

- PS2520G:** • 3 outputs: 0 V–6 V, 0 A–3 A (1); 0 V–36 V, 0 A–1.5 A (2) • Digital LED output indicator • SCPI compatible • GPIB programmable

- PS2521G:** • 3 outputs: 0 V–6 V, 0 A–5 A (1); 0 V–20 V, 0 A–2.5 A (2) • Digital LED output indicator • SCPI compatible • GPIB programmable

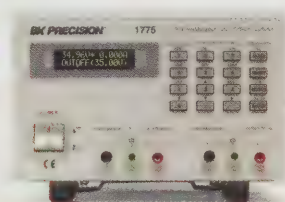


PS2521G

P/N	Description	1-4	5+
PS2520G	0 V–6 V, 0 A–3 A, GPIB programmable	\$1395.00	\$1325.00
PS2521G	0 V–6 V, 0 A–5 A, GPIB programmable	1395.00	1325.00

## B&K Programmable Power Supplies

- Bench-top power supplies with various outputs • Controllable via GPIB



1775

	1770	1775	1780
Outputs	1 Dual-Range	2	2
DC Voltage	0 V–16 V 0 V–35 V	0 V–35 V	0 V–18 V
DC Current	0 A–6 A 0 A–3 A	0 A–2 A	0 A–4 A
Programming	GPIB	GPIB	GPIB
Warranty	3 Years	3 Years	3 Years

P/N	Description	1-4	5+
1770	Programmable power supply, 0 V–16 V, 0 A–6 A	\$950.00	\$899.00
1775	Programmable power supply, 0 V–35 V, 0 A–2 A	1295.00	1224.00
1780	Programmable power supply, 0 V–18 V, 0 A–2 A	1350.00	1277.00



## LEADER Audio Sine/Square-Wave Generator

### LAG-126

Similar to the LAG-120B, the LAG-126 provides higher levels of accuracy, making it the ideal choice for demanding audio work. A vernier frequency dial allows for smooth, accurate tuning. The 10-dB, 1-dB and 0.1-dB step attenuators can be selected for audio reference levels of 0 dBm = 1 mW into 600  $\Omega$  or 0 dBV = 1 V RMS—they are a must when fast, repeatable, and absolute level settings are required.

- Low distortion: <0.005% • Wide band: 5 Hz–500 kHz • 80-dB step attenuator in 10-dB, 1-dB, and 0.1-dB steps • Detented  $\pm 0.1$ -dB fine adjust • Direct-reading dBm and dBV

### LAG-120B

This precision, wide-band audio sine/square-wave generator is used for testing and servicing audio equipment. The frequency-dial accuracy is  $\pm 3\%$  across the 10-Hz to 1-MHz range. The rotary 10-dB step attenuator and the 20-dB variable control offer an attenuation range of 70 dB. The rated output is 3 V RMS into a 600- $\Omega$  load and approximately 25 V p-p-open circuit. A terminator is provided as an accessory for 600- $\Omega$  source impedance requirements.

- Low distortion: <0.05% • Wide band: 10 Hz–1 MHz • 50-dB step attenuator • 20-dB variable attenuator • Rear-panel sync. input



LAG-126

LAG-120B

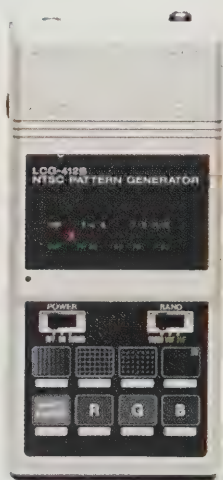
P/N	Description	1-4	5+
LAG-126	Audio sine/square-wave generator, stores 8 measurement sets, isolated serial interface	\$895.00	\$844.00
LAG-120B	Audio sine/square-wave generator	445.00	419.00

## LEADER Battery-Powered NTSC Pattern Generator

Small enough to slip into a coat pocket, briefcase, or toolbox, the LCG-412B is the ideal video pattern generator for field servicing of TVs, VCRs, and monitors.

It features baseband video output that handles the standard 75- $\Omega$  load, and provides full-field 75% color bars, crosshatch, dots, a corner marker, and white, red, green, or blue full-field rasters. These signals can also be modulated on VHF or UHF carriers, with 1-kHz internal sound modulation. Full broadcast coverage is provided with a slide-rule dial for channel indication. Power is provided by 6 AA cells and an AC adapter. LPS-169F sets up bench uses.

- Truly portable • Weighs less than 1 lb
- Baseband output drives 75  $\Omega$  • Full VHF and UHF coverage



LCG-412B

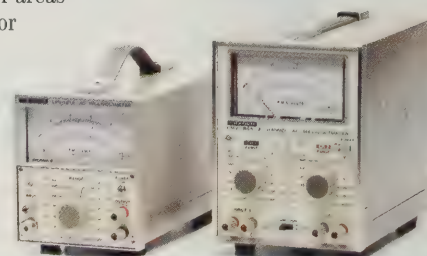
P/N	Description	1-3	4-9	10+
LCG-412B	Pattern generator	\$495.00	\$477.00	\$442.00
LPS-169F	Jack for DC power input from the AC adapter	20.00	—	—

## LEADER AC Millivoltmeters

The LMV Series of average-responding RMS-reading AC millivoltmeters are applicable to a wide range of general-purpose single- or dual-channel measurements. Both models feature a high sensitivity of 100  $\mu$ V and range to 300 V RMS maximum full scale with a wide bandwidth of 5 Hz to 1 MHz for the LMV-181A or to 500 kHz for the LMV-186A. Meter scales are conveniently calibrated in millivolts and dB (0 dBV = 1 V and 0 dBm = 0.775 V) with accuracies to within  $\pm 2\%$  f.s.

The LMV-186A has concentric dual-channel meter movements with separate needles on the analog display and a channel-reverse switch. For stereo audio, the LMV-186A is very apt for measuring record and playback levels, channel separation, balance and tracking tests of volume, loudness, and tone controls versus frequency, etc. The flat bandwidth of the amplified output terminals on both models often permit them to be used as sensitive, accurate instrument preamplifiers. Other areas of use include test and repair for communications, IF and ultrasonic circuits, and systems.

- Wide frequency range
- Calibrated in millivolts, volts, dBV, and dBm 600  $\Omega$
- $\pm 2\%$  accuracy of full scale
- 100- $\mu$ V sensitivity • Amplified output terminals



LMV-181A

LMV-186A

P/N	Description	1-4	5+
LMV-181A	Single-channel AC millivoltmeter	\$395.00	\$377.00
LMV-186A	Dual-channel AC millivoltmeter	845.00	809.00

## LEADER NTSC/PAL/SECAM Test/Sync. Generator

The products of years of evolution in video test generators, the Model 408 and Model 408NPS offer extensive capabilities in 3 major categories: (1) multiformat video test signals, (2) wide-range coverage with sound modulation, and (3) versatile programming and data storage/retrieval.

### Model 408

Microprocessor control and digital synthesis give the 408 extreme flexibility in test-signal programming of both video and RF outputs. The 408's test patterns include: crosshatch, convergence, window, and checker (these may be inverted in polarity). The color patterns include: modulated stair-step (5-step and 10-step), precision demodulator alignment, full-field and SMPTE color bars, flat-field (8 color rasters including white and black), and multiburst (last burst variable to 15 MHz and video sweep [0.1 MHz to 5 MHz or 0.3 MHz to 15 MHz with frequency markers]).

- Composite, RGB, Y/R-Y/B-Y, and SVHS • VHF, UHF, cable, and R-F coverage
- Programmable parameters • Storage for 100 programs • 15-MHz sweep and multiburst

### Model 408NPS

Designed to fill the needs of video operations that cross international boundaries, the Model 408NPS offers all of the powerful operating features of the Model 408 plus it supplies precision test signals to PAL, SECAM, and NTSC standards. In addition, applicable modulation is selected by system designation; and channel-frequency assignments, in use throughout the world, may be called up easily.

- NTSC M • PAL: B, C, D, G, H, I, K, and L • SECAM III: B, D, G, H, K, and L



408NPS

P/N	Description	1-4	5+
408	Video/sync. test generator	\$3745.00	\$3599.00
408NPS	NTSC/PAL/SECAM generator	6995.00	6695.00



# Tools for harmonics and power management

## FLUKE 39 and 41B Power Meters

The Model 39 power meter provides the instantaneous, straightforward measurements needed to evaluate power usage, troubleshoot electrical problems, improve power efficiency, and manage energy costs.

The Model 41B power harmonics analyzer adds the features needed to zero in on harmonics, optimize power-system performance, improve power quality, and analyze data.

Models 39 and 41B offer comprehensive measurements. They measure RMS, peak, and total harmonic distortion (THD) for complex voltages and currents—with no manual calculations. They also provide direct readings of power at the touch of a button, and display peak, power, and instantaneous power at any selected cursor position.

Three views enable you to view voltage, current, and power as a waveform, as a bar graph showing the levels of harmonics present, or as numeric values.

The real-time display updates 3 times per second, providing a dynamic view of actual circuit conditions.

Get system-critical data via immediate readings of crest factors, power factors, K-VAR, and K-Factor—with no manual calculations.

Standard equipment for each instrument includes: an 80i-500s AC current probe, test leads, test probes, and test clips. Model 41B also includes an isolated RS-232 cable and FLUKEVIEW software. A 1-year warranty is included.

### Models 39 and 41B

- Measure power and power factor on single-phase or balanced three-phase,

- three-conductor system from 1 single-phase measurement • Measure true-RMS voltage and current • Waveform, bar-graph with zoom mode, and numeric views of all measurements • Rated to 600 V, meet IEC 1010-1 safety standards • 1-button measurements-no menus • Display individual harmonics up to the 31st • Minimum, maximum, and average recording • Battery operated • Bright backlit display

### Model 41B

- Storage of up to 8 measurement sets of voltage and current
- Isolated serial interface for communications with a printer or DOS- or WINDOWS® compatible computer



FLUKE®

P/N	Description	1-4	5+
39	Power meter	\$995.00	\$944.00
41B	Power harmonics analyzer	1795.00	1710.00

## POWERTRONICS PROBE PLUS Power-Line Monitor

PROBE PLUS allows you to identify power and wiring problems that cause your equipment to malfunction or fail—test for sags and surges, power failures, spikes, noises, dropouts, and wiring problems.

- Tool-box-sized monitor • Easy to use, plugs into a regular wall outlet • Monitor short- or long-term power problems
- Takes a snapshot of power conditions and alerts user
- LEDs flash an indication of power problems • LEDs stay lit until reset button is pushed • 2-yr. warranty



P/N	Description	Each
PP-100	Probe 100, 110 V	\$295.00
PP-200	Probe 200, 220 V	315.00

## POWERTRONICS Power-Disturbance Analyzer

This multichannel analyzer tests up to 8 channels of AC/DC voltage or current. It also tests 3-phase power or multiple channels of other types of signals. The D-3000 prints the actual wave shapes of signals and disturbances.

- Built-in 80-column printer, accepts standard paper • Input range (all input channels): 0 V–700 V RMS (0 Hz–450 Hz) for AC voltage, 0 V–1,000 V for DC voltage, and 0 A–4,000 A AC/DC for current
- Programmable thresholds • User-friendly operations • Fast sampling rate of 50 ns • Independent channels • Battery backed RAM • Easy-to-understand printouts • Prints actual wave shapes
- Time and date stamps disturbances • Printout of detailed information shows magnitude/duration of event • 18-month warranty



P/N	Description	Each
D-500	1-ch. unit	\$3295.00
D-1000	2-ch. unit	3995.00
D-2000	4-ch. unit	5495.00
D-3000	8-ch. unit	7495.00

## POWERTRONICS POWER INVESTIGATOR

This power monitor helps you solve power problems. It is easy to operate and plugs into a wall outlet. It allows you to monitor for a few hours or several days—test for sags and surges, power failures, spikes, noises, dropouts, and wiring problems.

- Print a report including a suggested solution to the problem
- Counts up to 65,000 power problems on a power line • Displays all power problems stored in the battery-backed memory • Dumps directly to your printer—no computer or programming needed • Printouts: power-disturbance reports, cause-and-effect reports, and power-solutions guides • 18-month warranty



P/N	Description	Each
PI-500	POWER INVESTIGATOR	\$495.00

## POWERTRONICS Power-Quality Recorder and Voltage Logger

Plug this unit into a wall outlet and it independently records power problems in a battery-backed memory. After testing is complete, upload the events to a PC through a WINDOWS 95 program and a standard RS232 serial port. Up to 3,000 events can be stored in a time- and date-stamped format.

- Plugs into a regular wall outlet • Remote-capable through modem • Fast sample rate (captures impulses in .5 µs)
- Records a data log of voltage levels for graphical analysis • User-programmable set-points • Printouts: detail report, sine-wave graphics, bar charts, pie charts
- Voltage range: 90 V–300 V, 40 Hz–70 Hz
- 18-month warranty



P/N	Description	Each
PQR-D-50	2-ch, AC-voltage model	\$995.00



## LOGICAL DEVICES XPRO-1 EPROM/FPGA Programmer

- Powerful electronics features found only in high-end universal programmers
- Programs any CMOS or NMOS devices using family socket adapters
- Gang-head programs 8 EPROMs at a time • PC software included for DOS or WINDOWS 3.1
- Includes internal battery-back-up RAM for storing algorithms and data
- 1 Mbit of internal memory, upgradable to 4 Mbit
- Front-panel LCD for stand-alone operation

### Gang-EPROM-Programming Socket Heads

- Gang up to eight 8-Mbit EPROMs (32-pin)
- Automatic device detection
- Error-indicator LEDs
- Reads from master or file
- Verify high or low margins

### Universal EPROM/Micro Module

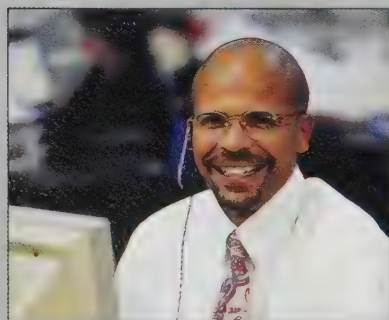
- Supports 2 EPROMs simultaneously • 24-, 28-, or 32-pin in gang or set mode
- Supports SET programming
- Supports 40-pin EPROMs
- Supports 87XX family of micros

### EPROM Label Printer

Includes: • Software • 2 rolls of labels (1 for DIP [1,000 labels] and 1 for PLCC [3,000 labels])



P/N	Description	Each
PROXP1-000	XPRO-1 base unit, 1 Mbit, nonstand-alone (PC mode only, no LCD or keypad)	\$495.00
PROXP1-104	XPRO-1 stand-alone/RS-232 base unit, 4-Mbit RAM	995.00
MODXP1-GD32	DIP gang module, 32-pin, 8-socket	595.00
MODXP1-GP32	PLCC gang module, 32-pin, 8-socket	595.00
MODXP1-UM1	Universal EPROM/micro module	495.00
SYSLAB-101	EPROM label printer	495.00



Need Help? Just Call.

## LOGICAL DEVICES Hand-Held Programmer

The SHOOTER II® is a cost-effective hand-held programmer with up-to-date styling and state-of-the-art technology.

- Alternative to PC-embedded programmers
- Includes WINDOWS and DOS applications software
- Programs to manufacturers' certified specifications
- High-speed RS-232-up to 115.2 KB
- Devices supported: EPROM's, EEPROM's, flash, CMOS PROMS, and serial to 8-Mbit DIP packages (8-, 24-, 28-, and 32-pin with 0.3" and 0.6" pitch) PLCC, SOIC, and TSOP adapters available
- Device library is internal in nonvolatile flash memory—fully updateable
- Device checks: connect test, reverse/faulty part test, bit check, empty check, verify, and marginal verify
- Memory: 4 MB (32 Mbits) expandable to 16 MB (128 Mbits) using 72-pin SIMMs
- Interface: 9-pin D-type RS-232 with up to 115-KB baud rate and RS-232 baud-rate selection (1,200; 2,400; 4,800; 9,600; 19,200; 38,400; and 115,200)
- Includes: 1-Mbit RAM, mains adapter, manual, and WINDOWS and DOS applications software



PROSTR-002

P/N	Description	Each
PROSTR-002	SHOOTER II hand-held programmer with battery	\$695.00

## LOGICAL DEVICES Universal Programmer

CHIPMASTER 6000 is a universal device programmer that works through your PC's parallel port. It features a 48-pin universal pin driver and an expandable TTL pin driver. An on-board processor and FPGA enable it to handle today's and tomorrow's complicated DIP-type silicon PLDs, microprocessors, and high-density memory chips without adapters. It supports over 1,200 different devices, including: PAL, GAL, CPAL, EPLD, PEEL, MAX, MACH, PLSI, microprocessor, EPROM, series EPROM, PROM, and flash memory.

- Fastest speed on the market, less than 100 s to program an 8-Mbit EPROM (with 486DX2-66 processor)
- Checks for incorrect device insertion (backward and incorrect position) and poor pin contact
- Optional ROM emulator for up to 1-Mbit chips
- User-selectable voltage verification with 1 or 2 passes
- Automatic file-format conversion



PROC6M-000

P/N	Description	Each
PROC6M-000	CHIPMASTER 6000	\$1495.00
OPTCM6-ROM	Emulator module, 1-Mbit ROM	395.00

## LOGICAL DEVICES GangPro LC

The GangPro is for high-capacity gang programming.

- Universal technology for programming EPROMs/FLASH/Micros/PROMs/PLDs/CPLDs/FPGAs
- Gang head programs 16 EPROMs/FLASH/Micros in DIP, PLCC, SOIC, TSOP, QFP
- Daisy chain multiple units for gang of PLDs and micro controllers
- PC software included for DOS or WINDOWS 3.1/WINDOWS 95/WINDOWS NT
- 4 MB of internal memory, upgradeable to 32 MB
- Front-panel LCD for stand-alone operation
- Software updates via BBS or floppy for new devices and algorithms
- High-speed serial-port communications (115-KB baud)
- Set-programming capability makes GangPro ideal for development use
- Super-fast programming speed, conforms to strict manufacturer's programming specifications
- 1-yr. warranty on parts, labor, and software
- LOGICAL DEVICES is available to custom configure any adapter, front-end software, or test application



MODGPL-16GD32

P/N	Description	Each
PROGPL-108	8-MB GangPro LC	\$1995.00
MODGPL-16GD32	16-socket DIP module	995.00
MODGPL-16GP32	16-socket PLCC module	995.00

## LOGICAL DEVICES UV Erasers

The QUV-T8/Z is the standard model for production or engineering applications. A convenient pull-out tray can store over a dozen devices. Since the trays are removable, several trays can be used to carry different batches of devices. Average erase times are between 10 min and 30 min.

The ULTRALITE model is an ideal, high-capacity, high-performance industrial UV eraser that is suited to production or engineering applications. The erase time is approximately 15 min. This unit can hold as many as 40 28-pin EPROM devices on the maximum-exposure area of its tray. The safe intensity level guarantees long life for EPROMs and other erasable devices.



ERAT8Z-000

ERALUV-000

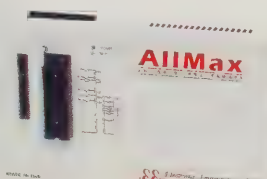
P/N	Description	Each
ERAT8Z-000	EPROM eraser, timer	\$169.95
ERALUV-000	ULTRALITE EPROM eraser	299.00
MISERA-R6B	Replacement bulb for ERAT8Z-000	20.00
MISERA-R8B	1 ULTRALITE replacement bulb (2 required)	20.00



## E. E. TOOLS™ ALLMAX/ALLMAX+®

This is a software-expandable, universal device-programming workstation that supports a wide variety of programmable devices—it also tests digital ICs. You can program programmable ICs and test TTL and CMOS logic ICs. Furthermore, you can test dynamic memory or statistic memory even if the ICs are defective.

- Works PC XT, AT, 386, 486, PENTIUM® • Supports PAL, EPLD, GAL, PEEL, FPLA, bipolar PROM, E(E)PROM (8/16 bit), flash PROM, microcontroller, and serial (E)PROM • Devices tested: TTL 74/75 series, CMOS 40/45 series • Memory test: dynamic memory, static memory • Number of devices: over 1800, 16-Mbit Max. EPROM size
- Program socket: standard 48-pin, gold, ZIF socket • Host interface: ISA-bus PC plug-in card
- Built-in hardware diagnostics/device auto-select
- Software update: 12 times/yr. (free for lifetime)
- BBS: 24-hr. support • 1-year warranty • Made in USA



ALLMAX

P/N	Description	Each
ALLMAX	Device-programming workstation	\$645.00
ALLMAXPLUS	Device-programming workstation	745.00

## EE TOOLS ROMMAX EE Programm

- Auto-search device selects function supports
- Device operations: Read, Blank Check, Program, Verify, Check Sum, Data Compare, Security, and Auto-programming • Extensive on-line help system provides text and graphics • Auto-programming for production programming • Built-in editor for both buffer date and test vectors • Support: INTEL HEX, MOTOROLA S RECORDS, TEKHEX, and binary file formats with Load, Edit, and Save commands • Distribution of 16- and 32-bit data into 8-bit portions • 32-pin ZIF (zero insertion force) socket accepts both 300-mil and 600-mil DIP devices up to 32-pin EPROMs • Use ISA BUS plug-in card • 1-yr. warranty

Includes: • PC plug-in card • 3'-long 40-pin ribbon cable • Installation diskette and manual



ROMMAX

ROMMAX-4G

P/N	Description	Each
ROMMAX	1-socket EPROM programmer	\$189.00
ROMMAX-4G	4-socket EPROM programmer	239.00

## E. E. TOOLS MEGAMAX-4G® Device Programmer

This is a cost-effective, high-quality, industrial-grade, universal device programmer that works through your PC's parallel port and can be configured to most any desired application through both software and family modules. Its unique hardware architecture with an on-board FPGA enables MEGAMAX-4G to support complicated DIP-type high-density memory, PLDs, and microcontrollers without adapters.

The MEGAMAX-4G can program as many as 4 devices at 1 time. In addition, it supports most popular CMOS, NMOS, and HMOS EPROMs and EEPROMs in gang modes up to 4 (24, 28, and 32 pin).

- Works with any speed PC XT, AT, 386, 486, PENTIUM, PS/2, or laptop computer • Supports 48-pin socket EPLD, GAL, PEEL, FPLA, and E(E)PROM (8/16 bit) • Flash memory, microcontroller, and serial (E)PROM • 32-pin, 4-gang socket E(E)PROM, flash memory • Number of devices: over 1,000
- Works host interface: standard parallel port-no plug-in card required • Program socket: 48 pin (1), 32 pin (3) • Supports device auto-select
- 1-year warranty
- Made in USA



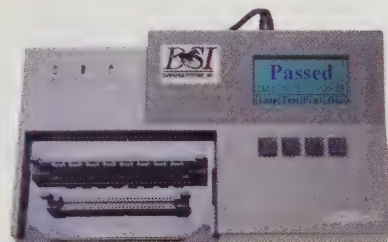
MEGAMAX-4G

P/N	Description	Each
MEGAMAX-4G	Device programmer	\$545.00

## DARKHORSE SIGMA LC Memory Tester

The SIGMA LC portable tester offers the latest technology for testing any type of computer memory module. A powerful 32-bit RISC processor enables the SIGMA LC to test at the rate of 1 MB per 4 s. It can test any industry-standard DRAM, SRAM, or 5-V flash chip in SIMM, DIMM, IC, or PCMCIA packaging.

- Easy to use • Provides a hard copy of memory test results • Limited 1-year warranty



20-003-03

P/N	Description	Each
20-003-03	Sigma LC w/30/72 plus docking adapter	\$1795.00
20-002-161	168-pin buffered docking adapter	595.00
20-002-170	144-pin SO DIMM docking adapter	349.00
20-033-13	DRAM SOJ docking adapter	199.00
20-002-151	Wide DRAM SOJ	199.00

## E. E. TOOLS TOPMAX

TOPMAX is the most sophisticated low-cost programmer available today. It is a software-expandable universal device-programming workstation that supports a wide variety of programmable devices and also tests TTL and CMOS logic ICs and dynamic memory and static memory whether your ICs are defective or not.

TOPMAX features a 48-pin universal driver and expandable TTL pin driver. It interfaces with IBM PC, XT, PS/2, AT, 386, 486, PENTIUM, portable (laptop), or compatible personal computers.

The operating software has a user-friendly interface that includes window-type pull-down menus, a macro facility for batch file execution, and virtual-memory management to deal with very large files. The software can read output from most compilers in POFF or JEDEC format such as CUPL, PALASM, ISDATA, and ABEL.

- Includes: • TOPMAX programmer with 48-pin ZIF (DIP) socket and built-in universal switching power supply (110 V AC-240 V AC) • 6' printer cable • 6' AC power cord • Installation diskette and manual



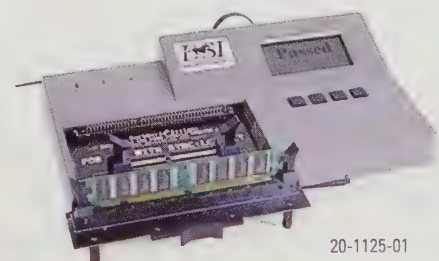
TopMax

P/N	Description	Each
TopMax	Programmer	\$995.00
TM-44PLCC	Adapter to support all 44-pin PLCC devices	145.00
TM-8G	Adapter to support 8 gang EPROMs up to 32 pins	285.00

## DARKHORSE Synchronous LC Memory Tester

The introduction of this product extends the success of the SIGMA LC into synchronous DRAM testing and reading/editing of serial PD bits and programming.

- Access-speed testing down to 8 ns (125 MHz equiv.) • User-selectable burst length and CAS latency • Serial PD programming and testing DIMM 144 and 168 test adapter included



20-1125-01

P/N	Description	Each
20-1125-01	Sync LC	\$2795.00



## HARRIS DRACON Test Sets

• High-quality sound • Affordable • Durable

### "MEAN GREEN" Test Set

The TS19 test set is built to go wherever you go—with a replaceable, spring-loaded belt clip and a comfortable integrated grip. It's economically priced and great for the in-house technician.

### The Technician's Favorite

From selectable tone/pulse dialing and DTMF loop-length signal compensation to last-number redial, polarity testing, and a mute function, the TS21 test set delivers the kind of quality that makes HARRIS built-in models the favorites among field professionals. The TS21 is fully compliant with automated voice-response systems, so it facilitates the quick completion of every job.

### Amplified-Speaker Test Set

The TS22 is built for speed. A 9-location, 18-digit dialer gives you rapid access to test boards, the CO, and other frequently called numbers. The last-number-redial feature eliminates the need to rekey your last entry. This is a must for every field technician.

### Speaker-Phone Data-Protection Test Set

The TS22AL can detect the presence of data on T1, E1, SW56, ISDN, PRI, ISDNBRI, HDSL, SRDL, and other high-frequency circuits. This unit is also a speaker-phone—for the field technician who wants to maintain contact with the central office while working on a complex task.

### Data-Protection Amplified-Speaker Test Set

The TS22L test set is equipped with data-protection technology. It features an audible tone in talk mode that warns the user immediately if a high-frequency digital line is contacted. It helps prevent current draw and the potential loss of user service. The TS22L is user friendly, reflecting the HARRIS philosophy of productivity enhancement. The test set features a built-in amplified speaker for hands-free, on-task monitoring. Other features include loop-length compensation, nine 18-digit speed-dial locations, last-number redial, tone and pulse dialing, and continuous polarity-indication LEDs.



## Proven Reliability in a Speaker Phone

With the TS22A test set, the technician can manage even difficult tasks more quickly and effectively, selecting from 3 audio levels for communication with computerized voice-response systems and CO maintenance administrators. And because the electret microphone and speaker are diametrically positioned, acoustical accuracy is assured. Noteworthy features of the TS22A test set include an audible electronic ringer, 1-touch-selectable tone/pulse operation, noise-reducing compensator circuit, 18-digit speed dialing with 9 memory locations, last-number redial, high-impedance monitor, and 2 LEDs for polarity indication.

### TS30 Test Set

HARRIS developed the new TS30 test set to deliver the sound and voice qualities you need as a professional technician. Advanced features and quality components like the high-impedance monitor allow you to clip onto a line without disrupting the existing signal on that line. And by using the latest integrated-circuit design, the TS30 test set provides both touch-tone and dial-pulse output to meet any requirement.

• High-impedance monitor mode • Last-number redial in tone and pulse modes • Rain-safe test set for use in extreme weather conditions • Hook flash • Audible electronic ringer for call-backs • High-impact polycarbonate case



Features	TS19	TS21	TS22	TS22L	TS22A	TS22AL	TS30
Tone and Pulse Operation	•	•	•	•	•	•	•
Last-Number Redial	•	•	•	•	•	•	•
DTMF Signal Levels Compensated for Loop Length	•	•	•	•	•	•	•
Solid-State Circuitry for Greater Reliability and Protection	•	•	•	•	•	•	•
Passes 20' Drop Test	•	•	•	•	•	•	•
Continuous Polarity Indication	•	•	•	•	•	•	•
For Use with Computerized Voice-Response Systems	•	•	•	•	•	•	•
Moisture Resistant in Severe Weather Conditions			•	•	•	•	•
Stores Nine 18-Digit Numbers in Repertory Dialer (Speed Dialing)			•	•	•	•	
Amplified Monitor Speaker			•	•	•	•	
Speaker Phone for True Hands-Free 2-Way Conversations					•	•	
Compensation Circuit to Reduce Environmental Noises					•	•	•
Electronic Ringer					•	•	•
Loop Limit	2.4 kΩ @ 48 V DC (minimum 15-mA loop current)	2.0 kΩ @ 48 V DC (minimum 20-mA loop current)	2.0 kΩ @ 48 V DC (minimum 20-mA loop current)	2.0 kΩ @ 48 V DC (minimum 20-mA loop current)	2.0 kΩ @ 48 V DC (minimum 20-mA loop current)	2.0 kΩ @ 48 V DC (minimum 20-mA loop current)	2.0 kΩ @ 48 V DC (minimum 15-mA loop current)
Talk-Mode Resistance (Typical)	150 Ω @ 8 mA	225 Ω	225 Ω	225 Ω	225 Ω	225 Ω	275 Ω @ 20 mA

P/N	Description	1-3	4-9	10+
19800-009	TS19 test set with angle bed-of-nails clip	\$124.95	\$121.00	\$117.00
21800-089	TS21 test set with ABN clip	199.95	193.00	187.00
22800-009	TS22 test set with ABN clip	279.95	272.00	263.00
22801-009	TS22A test set with ABN clip	364.95	354.00	343.00
22803-009	TS22L test set with ABN clip	359.95	349.00	338.00
22804-009	TS22AL test set with ABN clip	444.95	435.00	424.00
30800-009	TS30 test set with ABN clip	185.00	179.00	173.00



*New Product: This symbol represents the industry's latest offerings.*



*We provide telephone technical assistance with your purchases.*



## FLUKE 620 LAN CABLEMETER®

The new FLUKE 620 CABLEMETER verifies the correct termination, connection, and routing of LAN cabling. Utilizing a new technology, the 620 is the only instrument that can test whether or not a connection is properly implemented without using a remote unit at the other end of the cable. This allows the installers to "test the connection as they go."

Upon installing a connector, the installer can immediately verify that the connection is defect-free with a 620. No termination or connector is required at the other end of the cable. From 1 end, the 620 can detect the following: (1) an open circuit and the length to this open circuit (applies to each pair in a twisted-pair LAN cable), (2) a short circuit and the distance to this short circuit, and (3) a split-pair condition (the 620 shows the actual pairing detected).

- One person verifies each connection as he goes
- Tests all LAN cable types: UTP; STP; FTP; coaxial; and 2-, 3-, or 4-wire pairs in twisted-pair cables
- Detects wiring problems: open, short, crossed, reversed, split pair
- Locates wiring/connection errors, distance to the open or short
- Measures cable length
- Easy-to-use single rotary knob to select the test
- Portable, 50-hr battery life



620

P/N	Description	1-4	5+
620	LAN CABLEMETER	\$795.00	\$735.00

## FLUKE 610 CABLEMAPPER®

- The 610 determines UTP termination faults per LAN-cabling standard EIA/TIA 568 for ethernet and token-ring LANs
- Measures near-end cross-talk (NEXT) for split-pair identification
- Fault codes and cable identifier number indicated directly on front panel
- Bright LEDs signify pass (green) or fail (red) for each pair
- Handy carrying case organizes 610, cable identifiers, and manual
- Protective holster

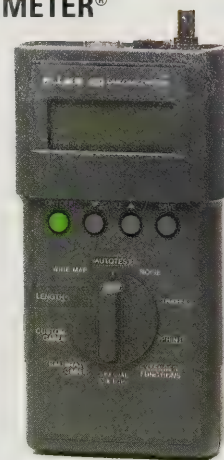


610

P/N	Description	1-4	5+
610	CABLEMAPPER	\$429.00	\$411.00

## FLUKE LAN CABLEMETER®

- Help pinpoint faults such as opens, shorts, and mis-wires, including crossed or split pairs and reversed connections
- FLUKE 650 measures attenuation and NEXT up to 10 MHz, then reports worst-case and assess characteristic and termination impedance



650

P/N	Description	1-4	5+
650	LAN CABLEMETER	\$1995.00	\$1839.00

## MICROTEST MICROSCANNER™

MICROSCANNER's WIREMAP function verifies that your 10BASE-T, TOKEN RING and other twisted-pair cabling is wired properly. If the wiring is faulty, WIREMAP identifies the problem and the faulty pair. Not only does it pinpoint "opens", "shorts", and reversed or crossed pairs, it also identifies split pairs.

The MICROSCANNER displays individual pair lengths and tells you if the cable is connected to a hub. You can be confident that "length" results are accurate because MICROSCANNER uses TDR (time-domain reflectometry) and can be calibrated

ed for a specific cable's NVP (nominal velocity of propagation). This is the only cable tester in its class that uses TDR—giving you the most accurate length measurements.



8200-00

P/N	Description	1-4	5+
8200-00	MICROSCANNER	\$399.00	\$379.00

## TEKTRONIX Optical Sources

The TOP Series hand-held instruments are for installing and maintaining fiber-optic networks. They are compact, rugged, extremely reliable, and come with an LED or laser source, an optical power meter, and a visual fault finder.

### TOP130 Optical LED Source

- Excellent long-term stability
- Dual-wave-length multimode (850 nm and 1,300 nm)
- selectable CW or modulated outputs

### TOP140/TOP150 Optical Laser Source

- Single-mode 1,310 nm (TOP140) and 1,550 nm (TOP 150)
- Stabilized calibrated output
- Hermetically sealed laser diode for longevity

### TOP160 Optical Laser Source

- Stabilized calibrated output
- Dual-wave-length single-mode (1,310 nm and 1,550 nm)

### TOP200 Optical Power Meter

- Relative dB mode for direct attenuation and insertion loss measurements
- 0.01-dB resolution
- Multiwavelength (850 nm, 1,300 nm, and 1,500 nm)

### TOP300 Visual Fault Finder

- 635-nm wavelength
- Universal connector inter-

face • Highly visual fiber tracing • Fault location to millimeter accuracy • Long battery life • Solid-state substitute for HeNe laser



P/N	Description	1-4	5+
TOP130-34	Optical LED source	\$995.00	\$945.00
TOP140-34	Optical laser source	1255.00	1193.00
TOP150-34	Optical laser source	1695.00	1605.00
TOP160-34	Optical laser source	3400.00	3230.00
TOP200-34	Optical power meter	795.00	755.00
TOP300-34	Visual fault finder	1445.00	1373.00

## B&K Universal Cable Tester

The Model 205 cable tester is the most versatile multi-cable tester on the market. This portable stand-alone cable/harness tester can test any cable up to 128 points. It detects "opens", "shorts", and "mis-wires" in under a second by comparing the test result with a reference file or the data derived from a sample cable. Error messages are displayed on the LCD or printed out via the RS-232 port to a standard printer. A single PCB (supplied) accepts commonly used connectors that are user-configurable. There are no additional connector adapters to purchase.



P/N	Description	1-4	5+
205	Cable tester	\$895.00	\$840.00



# Introducing the FLUKE DSP-100 CABLEMETER

## FLUKE LAN CABLEMETER with Category-5 Testing and Unique Diagnostic Capabilities

Certify your Category-5 UTP cabling installation with confidence—use the FLUKE DSP-100. A rugged, hand-held field tester that uses a revolutionary digital technology to give you a powerful combination of capabilities. And, it is designed to meet the most stringent TIA Accuracy Level II specifications for all link types (basic link and channel)—performance independently verified. Only FLUKE's patented TIME DOMAIN CROSSTALK (TDX™) analyzer instantly pinpoints NEXT (near-end crosstalk) faults due to bad connectors, poor workmanship, or improper cable. The DSP-100 tests a 4-pair UTP cable from both ends in less than 17 s—faster and more completely than any other tester. The FLUKE DSP-100 uses a truly revolutionary test technique. To measure the critical parameter of NEXT between 2 pairs, the DSP-100 sends a pulse (a pulse that very closely resembles the signals transmitted on 100-Mbps local-area networks) into 1 pair and captures the signal induced by this pulse on the other pair. The captured signal is analyzed using digital-signal-processing algorithms to provide a very accurate pic-

ture of NEXT in both the frequency domain and time domain. And since 1 pulse replaces hundreds of test frequencies, the DSP-100 is able to be extremely fast without compromising accuracy.

**Diagnostics**—The time-domain analysis of NEXT called TDX, pinpoints the distance to the location of crosstalk problem(s). Rather than tell the technician that a link fails because the “worst-case” NEXT value exceeds the limit at some frequency, the DSP-100 reports the distance to the location where the crosstalk is occurring.

**NEXT Measurement from Both Ends of the Link**—The TIA TSB-67 link standard requires that the NEXT measurement be performed from both ends of the link. The FLUKE DSP-100 supports this requirement in 2 ways: You can use a “smart-remote” unit (optional) or you can use 2 standard DSP-100 testers. To convert a standard remote unit into a 2-way tester, simply purchase a “smart-remote” unit.

**Sophisticated Test-Results Management**—The DSP-100 stores test results for up to 500 links for printing or downloading to a computer. Each link's test results may be identified by a user-defined label. WINDOWS®-based DSP-LINK™ software brings “point-and-click” simplicity to the task of transferring data or updating your DSP-100—and it's included free. All units come with a soft carrying case, AC adapter, user manual, software, and your choice of remote.

• Laboratory-level accuracy in a hand-held field tester • Record test time: complete test of a 4-pair Category-5 cable in less than 17 s • Automatically tests NEXT from both ends • Tests a wide variety of LAN cabling systems: UTP, FTP, STP (IBM Type 1.2, 6.9) • Free WINDOWS®-based DSP-LINK software delivers sophisticated test results and data management

Features	DSP-100
Attenuation Frequency	100 kHz–105 MHz
Link Length	Twisted Pair: 100 m–760 m (2,500 ft) Coaxial: 100 m–1,200 m (4,000 ft)
Accuracy	±(0.3 m [1 ft] +4% of reading)
Near End Crosstalk (NEXT)	
Resolution	0.1 dB
Range	0 dB–30 dB
DC Loop Resistance	
Range	0 Ω–400 Ω
Resolution	0.1 Ω
Characteristic Impedance	
Range	Twisted Pair: 70 Ω–180 Ω Coaxial: 35 Ω–100 Ω
Accuracy	±(5 Ω + 5% [nom.-meas'd])
Memory	Saves up to 500 test results

P/N	Description	1-4	5+
DSP-100	CABLEMETER with standard remote	\$2495.00	\$2325.00
DSP-100/SR	CABLEMETER with smart remote	4425.00	4130.00
DSP-SR	Smart remote	2495.00	2399.00



DSP-100

DSP-FOM

## FLUKE Fiber-Optic Test Equipment

The FLUKE fiber-optic meter (FOM) helps you test and maintain fiber-optic cable without having to buy a new meter. Simply plug the FOM directly into the DSP-100 to quickly and accurately verify fiber-optic cable system loss.

- Operating temperature: 32 °F to +104 °F (0 °C to +40 °C)
- Storage temperature: -4 °F to +158 °F (-20 °C to +70 °C)

Features	DSP-FOM
Wavelength	850 nm, 1,300 nm, and 1,550 nm
Dynamic Range	+3 dBm to -50 dBm
Absolute Accuracy	±25 dB
Display Resolution	0.01 dB (0.001 [W/J])

Features	FOS850	FOS1300	FOS850/1300
Wavelength	850 nm 30 nm	1,300 nm -40 nm/ +50 nm	850 nm/1,300 nm ±30 nm/ -40 nm/+50 nm
Output Power	-20 dBm	-20 dBm	-20 dBm

P/N	Description	Each
DSP-FOM	Fiber-optic meter	\$495.00
FOS850	Fiber-optic source, 850 nm ±30 nm	195.00
FOS1300	Fiber-optic source, 1,300 nm	395.00
FOS850/1300	Fiber-optic source, 850 nm/1300	495.00
FOS-ST/FC	Fiber-optic source assembly cable	49.00
FOS-ST/SC	Jumper cable	39.00

## FLUKE DSP-2000 CABLEANALYSER™ and DSP CABLE MANAGER™

If you're installing and maintaining high-speed networks, such as fast ethernet, the DSP-2000 is for you. Testing cable systems with older analog cable scanners may not guarantee the performance of the cabling when high-speed networks are installed. Not only does the DSP-2000 certify these links with Level II accuracy—the highest level of confidence—but its unique FAULT INFO feature shows you exactly where the link is failing. The diagnostics are displayed in a graphic representation and in plain language. Whether it's poor workmanship, a bad patch cord, or improper cabling, FAULT INFO tells you how to get your link

ready for the demands of high-speed networking.

The DSP-2000 also lets you monitor both 10BASE-T and 100BASE-TX networks—so you can immediately know if the cable link is the source of the problem. This saves time and assures that your high-speed network is really ready to go. Find active ports,



DSP-2000

measure utilization and collisions, and detect jabbering workstations—all with a single test.

CABLE MANAGER is a powerful WINDOWS®-based software package that organizes your cable-test reports into a computer database.

- Audible tone indicates amount of traffic
- Monitors 10-Mbps ethernet traffic on coaxial cable using RJ45-to-coaxial adapter
- Monitors and auto-negotiates 10BASE-T and 100BASE-TX ethernet traffic using RJ45 monitor jack
- Blinks the link light on a 10BASE-T, 10/100BASE-TX, or 100BASE-TX hub

P/N	Description	1-4	5+
DSP-2000	CABLEANALYSER	\$5495.00	\$5210.00
DSP-CMS	CABLE MANAGER software	295.00	—



## Introducing the New MICROTEST PENTASCANNER Category-5 Testers

### PENTASCANNER+™

If you're evaluating a new Category-5 tester, then look to MICROTEST—the company that invented hand-held cable testing. The superior accuracy of its new PENTASCANNER+ and PENTASCANNER 350™ comes from years of knowledge and experience testing and certifying network cabling systems. Both units exceed the minimum-accuracy performance requirements for Level II field testers as specified in EIA/TIA Draft TSB-67.

There are 2 PENTASCANNER+ kits to choose from: The PENTASCANNER+ with a 1-way SUPER INJECTOR™, to perform 1-way measurements quickly and accurately; and the PENTASCANNER+ with a 2-way injector, for faster cable certification—it allows you to measure NEXT and ACT (attenuation-to-crosstalk ratio) simultaneously from both ends of the installed link.

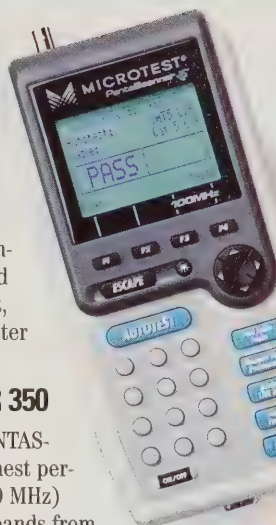
- Tests 155 Mbps ATM • Measures near-end crosstalk (NEXT), attenuation, resistance, attenuation to crosstalk ratio (ACR), and wiremap
- Monitors and graphs network traffic • Prints complete, easy-to-read certification reports
- Allows you to program your own test limits and

customize your auto-tests • Stores up to 500 auto-tests • Allows flash-ROM updates from the field • Includes a replaceable, rechargeable battery for all-day use • Incorporates a graphical backlit display and online help • Smallest, lightest Category-5 tester available • Durable

### PENTASCANNER 350

All the features of PENTASCANNER+ and: • Highest performance grading (350 MHz) • Measures "quality" bands from 1 to 7, with 1 being marginally passing and 5 and 7 being the highest link performances to date • Can differentiate links that are marginally passing from those that have up to 70 times better signal-to-noise ratios

P/N	Description	Each
8150-00	PENTASCANNER+ with 1-way injector	\$3495.00
8130-00	PENTASCANNER+ with 2-way injector	4595.00
8180-00	PENTASCANNER 350	4795.00



Features	PENTASCANNER+ and 350
<b>Near-End Crosstalk (NEXT)</b>	
Range	0.7 MHz–100 MHz
Accuracy	Typical: 0.3 Max.: 0.6
<b>Attenuation</b>	
Range	1.0 MHz–100 MHz
Accuracy	Typical: 0.5 Max.: 0.9
<b>Length</b>	
Range	0'–3,000' (Twisted-Pair Cable) 0'–4,000' (Coaxial Cable)
Accuracy	4% of Length or 2'

## TEKTRONIX TEKRANGER™ Mini-OTDR

TEKRANGER, with the INTELLITRACE™ automated fiber-analysis system, is a rugged, easy-to-use, mini optical time-domain reflectometer (OTDR) with precise single-mode or multimode operations that are viewable on a 7" display. It is the only mini OTDR that can report a splice 5 m away while also finding splices 100 km away—at the push of a button.

- 1-button automatic fiber analysis • Large, high-resolution display • Easy-to-change wavelengths • 5-m single-mode dead zone • 8-m multimode dead zone
- 0.02-dB loss threshold • 32-dB single-mode dynamic range • 28-dB multimode dynamic range • 15-dB to 60-dB selectable reflectance threshold • Echo detection • Internal memory for 200 waveforms • RS-232 and parallel ports

LAN configuration includes:

- 850/1,300 MM optical module • Disk drive • FMTAP SW • Hard case • Opt 24 connectors

Installer configuration includes:

- 850/1,300 MM optical module • 1,310/1,550 SM optical module • Disk drive • FMTAP SW • Hard case • Opt 24 and 31 connectors



P/N	Description	Each
TFS3031AN	TEKRANGER, LAN configuration	\$14000.00
TFS3031AX	TEKRANGER, installer configuration	18500.00

## MICROTEST CertiFiber™

Introducing CertiFiber, the world's first multimode fiber-certification tool, from the leader in standards-based cable certification. With CertiFiber, everything is done for you. Select the fiber standard and press the auto-test button. CertiFiber automatically runs the length, propagation delay, and dual fiber loss measurement for 850 nm and 1,300 nm. In seconds, you have a pass/fail result based upon the length, propagation delay, and dual fiber loss measurements. This autotest result can be stored (up to 1,000 autotests) and printed in a professional certification report for your customers. CertiFiber also certifies the links for network-specific fiber applications such as 10BASE-F, 100BASE-F, 1000BASE SX, ATM155, FDDI, and FIBER CHANNEL. With CertiFiber, the collective results of up to 100 fiber links can be time and date stamped, given alphanumeric names, and stored internally. The results can be downloaded to a PC with free SCANLINK™ software and can be saved for use with MT CRIMP™.

- Includes: • CertiFiber • CertiFiber remote • SCANLINK diskette • 6 AA alkaline batteries • Serial cable • User guide • Warranty registration card



8240-00

P/N	Description	Each
8240-00	CertiFiber	\$3995.00



## IDEAL Tone Generator

Installers of electrical, telephone, data, and security cables will find this rugged tone generator to be a great tool for locating and identifying cable pairs or individual conductors—it also serves as a continuity and polarity tester. The powerful signal provided by this generator can be detected up to 50,000 ft away and can operate through low-resistance circuits. Test results (reverse polarity, correct polarity, and AC-power indication) are displayed on a 3-color LED. The unit can be connected to a standard phone jack via its modular connector lead.

### IDEAL Amplifier Probe

The identification and tracing of metallic wiring is easy with this amplifier. The probe's construction allows work to be performed without risk of damage to the insulated conductor. This versatile unit can be used with any tone generator under typical job-site conditions.

Includes: • On/off switch  
• Volume control • Recessed terminal ports in handset



62-100

P/N	Description	Each
62-100	Tone generator	\$29.30
62-104	Amplifier probe	64.45
33-804	Tone-generator and probe kit	99.95

## TRIPLETT WIREMASTER™ XR

This LAN-cable test set with tracer tone is perfect for verifying the continuity of 2-, 3-, or 4-pair UTP cables. It senses reversed, shorted, transposed, crossed, and open pairs. It also generates a tracer tone for locating unenergized LAN cables with an inductive tracer, such as the HOUND2 probe.

• 8 LEDs identify the source and destination of each conductor • Direct connection of 8-pin RJ-45 or 6-pin RJ-11 cables • Generates 2 distinct tones useable for cable tracing • Allows remote testing of cable runs up to 1,000 ft

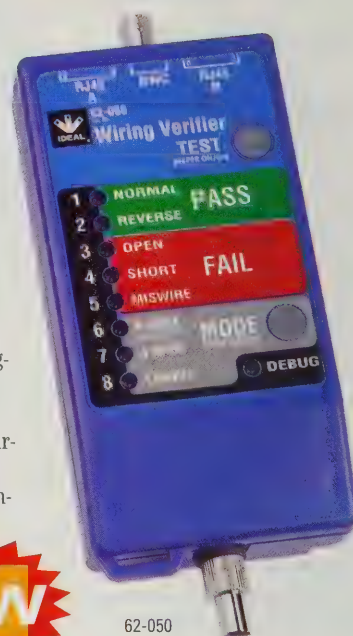


3254

P/N	Description	1-4	5+
3254	WIREMASTER	\$99.00	\$92.40

## IDEAL Wiring Verifier and Patch-Cable Tester

The IDEAL wiring verifier provides fast and reliable testing of continuity and wiring schemes of paired cables terminated with modular plugs as well as verification of conductor continuity for coaxial cables. Two-, 3-, and 4-pair cables may be flat in construction or round with twisted inner pairs. Indications of opens, shorts, miswires, reversals, and crossed pairs are provided by the tester when applied to modular-plug cable assemblies. Special wiring configurations are accommodated by the wiring verifier's unique LEARN mode. The dependable, long-life solid-state circuitry features a memory chip to allow for the testing of cable assemblies without prior identification of wiring schemes. Test results are indicated by a visible display or optional audible-tone output.



62-050

P/N	Description	Each
62-050	Wiring verifier and patch-cable tester	\$96.95
62-055	Pouch	9.95

## IDEAL VIDEOTRACKER® Tester

The VIDEOTRACKER along with its 8 remote color-coded F-type terminators enable a single technician to quickly and easily map, text, and verify installed coaxial cabling. Each remote F-type terminator has a unique resistor value to identify a specific cable-connection address for mapping. A main unit and at least 1 remote terminator are required to perform coaxial-cable testing. Remote terminators are not required to send a tone signal on coaxial cable in "TONE" mode. A 9-V alkaline battery is installed in the main tester unit. High-intensity LEDs provide a clear indication of cable and connection status, including "opens" and "shorts". An indication that voltage is present is provided by flashing LEDs and a beeper—when the tester is connected to a live or powered circuit. You can test CATV and video coaxial cables that are installed with F-type connectors.

### VIDEOTRACKER Tester Kit

Kit includes: • VIDEO-TRACKER Tester • 8 color-coded F-connector terminators • Convenient soft carrying case



62-020

P/N	Description	Each
62-020	VIDEOTRACKER tester with 8 F-connector terminators	\$119.95
33-816	VIDEOTRACKER tester kit	131.95



## TRIPLETT LANFOX™ and HOUND 2

### LANFOX

The LANFOX tone generator is a compact, hand-held instrument designed to generate tracer tones for locating un-energized LAN cables. When used with an inductive amplifier, such as the HOUND 2 probe, cable tracing is quick and easy. The single selector switch sets the tone of the LANFOX to high or low warble and a LED shows you when the unit is on.

- Generates 2 distinct tones—can be used for LAN cable tracing • Direct connection of standard RJ-45 modular plugs • RJ-45 to BNC adapter allows for tracing of BNC cables

### HOUND 2

The HOUND 2 probe is an inductive tracer capable of identifying the LANFOX's tone up to 12" away without piercing a wire's insulation. It has an adjustable volume control and an LED that intensifies as the tone signal gets stronger.

- High-gain, high-impedance amplifier • Rugged, moisture-resistant MYLAR conespeaker • Uses a standard 9-V battery



3243



3236

P/N	Description	Each
3243	LANFOX tone generator	\$29.00
3236	HOUND 2 probe	47.00
3248	LANFOX and HOUND 2 set	71.00

## TEKTRONIX FIBERMASTER® Optical Time-Domain Reflectometer

FIBERMASTER is the only OTDR equipped to accommodate 2 dual-wavelength optical plug-in modules at the same time. Fully utilized, this feature gives you dual-wavelength multimode and dual-wavelength single-mode optical cable testing at the touch of a button. This allows testing of virtually any communications network (TELCO, CATV, or LAN) without switching modules.

- Pop-up menus • Floppy-disk drive • Automatic/manual masking • GPIB and RS-232C interfaces • High-speed processing (C32-bit processor) • High-resolution color-display system • Link and event-return-loss capability • Operator's manual, soft carrying case, front-panel cover, and power cord



TFP2A

P/N	Description	Each
TFP2A	FIBERMASTER with color display	\$12800.00
TFP2A-01*	TFP2A with 850-nm multimode	21300.00
TFP2A-03*	TFP2A with 850-nm/1,300-nm multimode	29300.00
TFP2A-04*	TFP2A with 1,310-nm single-mode	29300.00
TFP2A-05*	TFP2A with 1,550-nm single-mode	30300.00
TFP2A-06*	TFP2A with 1,310-nm/1,550-nm single-mode	35800.00

\*Options are special-order items.

## UNICOM Video/Audio Adapter

- Built-in impedance-matching device and filter for baseband video-channel signal transmission over inexpensive Cat-5 UTP cables. • Handle either NTSC or PAL video signals • 2 optional audio channels can be used for HP stereo signal • Easy installation with existing premised wiring and wall jacks.



VAA-U501-V

P/N	Description	Each
VAA-U501-VA	Baseband A/V adapter with video and audio interference	\$58.50
VAA-U501-V	Baseband A/V adapter with video interference only	50.80
CBP-MF	BNC (male) to phone jack adapter	.80

## UNICOM Video/Audio Booster

- 4-pair cables from each port are grouped together on either top or bottom • Optional designation-label strips available in 6 different colors for each 8-port section (sold separately)

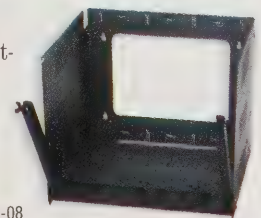


VAA-U561-VA

P/N	Description	Each
VAA-U561-VA	Video/audio booster 6 outputs	\$320.00

## UNICOM 19" Pivoting Wall Mount

- Tie points for internal cable management • Built-in cable management • "Multi-Rails" are tapped 10-32 one side, 12-24 on the other, ensuring versatility • Unique design allows punching down open • Ht: 16.25", 8 rack units, 15" depth, 60 lbs • Includes VELCRO™ cable loops.

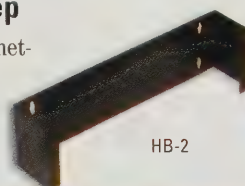


RMP-AP012B-08

P/N	Description	Each
RMP-AP012B-08	19" pivoting wall mount	\$100.00

## Wall Mount Brackets 4" and 12" Deep

- Ideal for improving cable management on small network installations • Feature a hinge on one side to facilitate adds and changes to the mounted panels • Cable access holes located on the back of the brackets.



HB-2

### 4" Deep

P/N	Dimensions	Rack Space	No. of Holes	Hole Dimensions	Each
HB-1	19"Wx1.75"Hx4"D	1	0	—	\$12.50
HB-2	19"Wx3.50"Hx4"D	2	1	1.5"x8"	13.30
HB-3	19"Wx5.25"Hx4"D	3	1	1.5"x8"	15.20
HB-4	19"Wx7.00"Hx4"D	4	1	1.5"x8"	18.90
HB-5	19"Wx8.75"Hx4"D	5	2	1.5"x8"	21.50
HB-7	19"Wx12.25"Hx4"D	7	2	1.5"x8"	28.40

### 12" Deep

P/N	Dimensions	Rack Space	No. of Holes	Hole Dimensions	Each
HB-4-C1	19"Wx7.00"Hx12"D	4	1	1.5"x8"	\$27.80
HB-7-C1	19"Wx12.25"Hx12"D	4	1	1.5"x8"	36.00

## UNICOM Wire Minders

### WM-01

- 1 steel D-ring on each side and 2 rows of 12 plastic wire saddles in between • Holds patch cords in a horizontal arrangement



WM-01

### WM-02

- 7 durable D-rings on each side and 2 rows of 12 plastic saddles in between • Holds patch cords in a horizontal arrangement



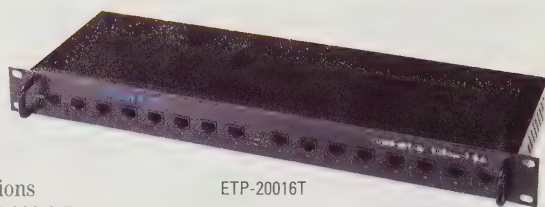
WM-02

P/N	Description	Each
WM-01	Wire minder, 1 steel D-ring	\$23.55
WM-02	Wire minder, 7 steel D-rings	28.95



## UNICOM DYNA-NET® 10Base-T Hubs

- Support up to 16 10Base-T workstations
- Conform to IEEE 802.3 Repeater, 10Base-T, 10Base-2, and 10Base-5 Standards
- Automatically partition off bad ports to protect your network
- Provide 16 RJ-45 station ports, 1 BNC port, and 1 AUI port • Include: 115-V AC, 3-A or 220-V, AC, 1.5-A internal switching power supply • Equipped with power, coaxial, AUI, collision, and station port LEDs to indicate connection status • Can be integrated into a large network via thick ethernet, thin ethernet, and/or UTP for backbone



ETP-20016T

P/N	Description	Each
ETP-20016T	DYNA-NET 16-port 10Base-T Hub	\$304.00
ETP-20012T	DYNA-NET 12-port 10Base-T Hub	287.00
ETP-20008T	DYNA-NET 8-port 10Base-T Hub	108.00

## UNICOM XTEND-2/FL Converter

- Converts existing 10Base-2/FL Ethernet to a 10Base-FL network • Allows up to 2,000 meters between fiber optic connections
- Conforms to IEEE 802.3 10Base-2/FL and 10Base-FL Standards • Backward compatibility for communication between FOIRL and 10Base-FL links • Equipped with LMON, COL, XMT, POWER, JAB and BNC/RCV LEDs • 9VDC /1 Amp external power adapter included.



ETP-20118

P/N	Description	Each
ETP-20118	XTEND 10Base-2/FL Converter	\$275.40

## UNICOM 10Base-FL Transceiver

Converts an existing thick-ethernet adapter card into a fiber-optic connection • Conforms to IEEE 802.3, 10Base-5, and 10Base-FL Standards • Allows up to a 2,000-m distance between fiber-optic connections • Provides backward compatibility for communications between FOIRL and 10Base-FL transceivers over 1,000 meters of fiberoptic cable • Super-slim design is ideal for SUN SPARC®, IBM RISC/6000, and APPLE® MACINTOSH®.



ETP-20098

P/N	Description	Each
ETP-20098	10Base-FL transceiver	\$168.00

## UNICOM XTEND-T/FL Converter

- Converts existing 10Base-T ethernet to 10Base-FL network • Conforms to IEEE 802.3, 10Base-T, and 10Base-FL Standards • Allows up to a 2,000-m distance between fiber-optic connections
- 10Base-T switch to select hub or workstation • LEDs for simple troubleshooting and network maintenance • Includes: 9-V DC, 1-A external adapter

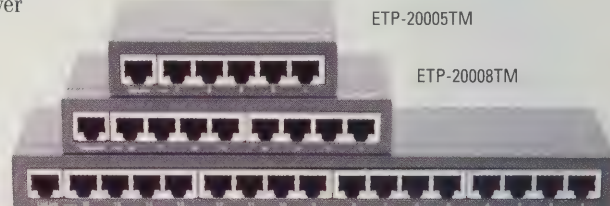


ETP-20108

P/N	Description	Each
ETP-20108	XTEND-T/FL converter	\$275.00

## UNICOM Micro-Net Hubs

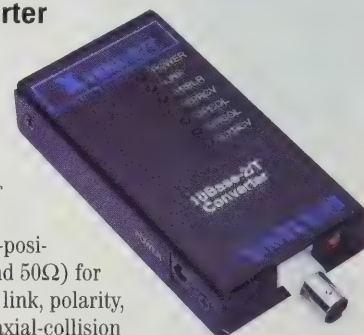
- Compact, lightweight and slim-line designed for desktop or wall-mount
- Provides 5, 8 & 16 shielded RJ-45 station ports (ports 5, 8 & 16 can be used as uplink ports). The 8 and 16 ports hubs come with 1 BNC port and 1 AUI on the 16 port • Conforms to IEEE 802.3 repeater. The 8 and 16 ports both support 10Base-2 and 10Base-T standards, while the 5 port only supports 10Base-T standards • Automatically partitions off bad ports to protect your network
- Equipped with Power, Collision, Link and Activity LEDs for network diagnostic and management • Power adapter included.



P/N	Description	Each
ETP-20005TM	Micro-Net/5, 5 ports 10Base-T	\$61.00
ETP-20008TM	Micro-Net/8, 8 ports 10Base-T, 1 BNC	85.00
ETP-20016TM	Micro-Net/16, 16 ports 10Base-T, 1 BNC & 1 AUI	156.95

## UNICOM XTEND-2/T Converter

- Converts existing thin ethernet to 10Base-T • Conforms to IEEE 802.3, 10Base-T, and 10Base-2 Standards
- Flexible 2-position switch for 10Base-T hub or workstation connection • Provides female BNC connector for thin ethernet and RJ-45 jack for 10Base-T hub connection • Flexible 3-position terminator switch (open, 25Ω, and 50Ω) for thin ethernet • Equipped with power, link, polarity, UTP-collision, coaxial-receive, and coaxial-collision LEDs to indicate connection status.

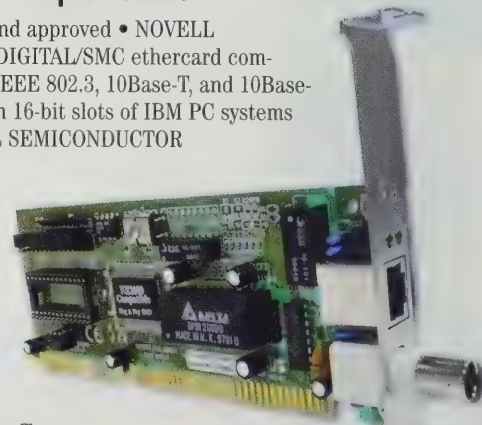


ETP-20038T

P/N	Description	Each
ETP-20038T	XTEND-2/T converter	\$111.00

## UNICOM Ethernet Adapter Cards

- NOVELL LABs tested and approved • NOVELL NE2000® and WESTERN DIGITAL/SMC ethercard compatible • Complies with IEEE 802.3, 10Base-T, and 10Base-2 Standards • Operates in 16-bit slots of IBM PC systems
- Built-in NS (NATIONAL SEMICONDUCTOR CORP.) chip set provides the most reliable quality in the industry



ETP-4104-EP

## PCI 32-Bit Ethernet Adapter Card

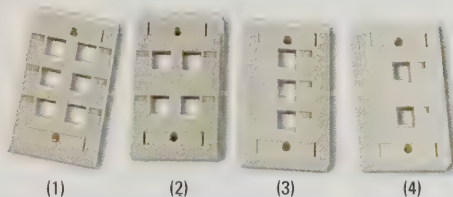
- Software configuration for interrupt line, I/O, and PROM address
- Auto detection of 10Base-T or 10Base-2 media types • Powerful diagnostic tools for easy troubleshooting
- Supports full-duplex ethernet mode.

P/N	Description	Each
ETP-4104-EP	2-in-1 16-bit ethernet adapter card, PnP	\$41.55
ETP-4204-EP	PCI 32-bit ethernet adapter card, PnP	43.10
FEP-4206-E	10/100 Mbps Fast Ethernet PCI adapter card, PnP	59.40



## UNICOM MIO+™ (Multi-Port Information Outlet)

• Supports 1 to 6 modular jacks in 1 face plate • 45° angle controls bend radius to meet EIA/TIA 568-A Standard • Available in white or beige • Keystone jacks and insert icons are available in 7 different colors for application and department I.D.

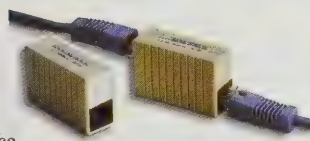


P/N	Description	Each
MIOPI-MPU06-XX** (1)	MIO+ 6-outlet face plate*	\$1.10
MIOPI-MPU04-XX** (2)	MIO+ 4-outlet face plate*	1.10
MIOPI-MPU03-XX** (3)	MIO+ 3-outlet face plate*	1.10
MIOPI-MPU02-XX** (4)	MIO+ 2-outlet face plate*	1.10
MIOPI-MPU12-XX*	MIO+ 12-outlet face plate*, angled	1.50
MIOPI-MPU14-XX*	MIO+ 14-outlet face plate*, angled	1.50
MIOPI-U58AA-YY**	MIO+, Cat-5, RJ-45, T568A-wiring modular jack	3.40
MIOPI-U58AB-YY**	MIO+, Cat-5, RJ-45, T568B-wiring modular jack	3.40
MIOPI-U36AU-XX**	MIO+, Cat-3, RJ-12, 6-wire, USOC-wiring modular jack	2.25
MIOPI-U38AU-XX**	MIO+, Cat-3, RJ-45, 8-wire, USOC-wiring modular jack	2.40
MIOPI-CX8TB-XX**	MIO+ coaxial BNC/BNC-keystone jack	2.15
MIOPI-CXPTP-XX**	MIO+ coaxial phono/phono-keystone jack	1.65
MIOPI-F0STS-XX**	MIO+ fiber-optic ST/ST-keystone jack	6.00
MIO-U5MB-BG	Mounting box for MIO+ face plate, beige	1.65

\*MIO+ face plate can be used with UNICOM or equivalent keystone jack. \*\*XX=Color (WT=white, BG=beige). YY=Color (WT=white, BG=beige, RD=Red, GN=green, YL=yellow, BK=black).

## UNICOM In-Line Coupler

• Slide-latch design allows you to connect any number of modules together to create a multi-port module • Designed for modular keystone jacks • Provides 3 icon areas to make identification easier • U.S. patented • Holds both RJ-45 and RJ-12 keystone jacks.



P/N	Description	Category	Wiring	Each
ILC-U508A-XX**	In-line coupler	5	T568A/B	\$6.60

\*\*XX = Color (WT=white, BG=beige).

## UNICOM Keystone-Jack Patch Panel

• Supports up to 12 keystone jacks • Wall mountable so it's easy to install and easy to maintain • Special notch on panel allows for easy adds and changes for any port • T568A and T568B wiring.

P/N	Ports	Keystone Jacks	Category	Wiring	Each
PATU5-812C-WA	12	12 RJ-45, black	5	T568A	\$56.00
PATU5-812C-WB	12	12 RJ-45, black	5	T568B	60.00
PATU5-012C-W	12	None	N/A	N/A	16.00



## UNICOM Expandable Surface-Mount Module

• Slide-latch design allows you to connect any number of modules together to create a multi-port module • Designed for modular keystone jacks • Provides 3 icon areas to make identification easier • U.S. patented • Holds both RJ-45 and RJ-12 keystone jacks.

P/N	Description	Each
SMM-U01E-XX**	UTP, single port, keystone jack not included	\$1.05
SMM-U81A-XX**	UTP, single port, RJ-45 jack, T568A	4.50
SMM-U81B-XX**	UTP, single port, RJ-45 jack, T568B	4.40

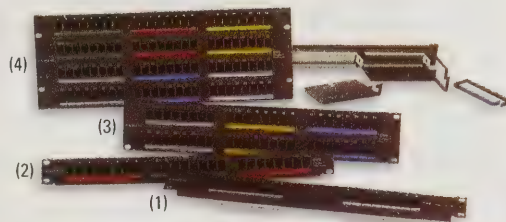
\*\*XX=Color (WT=white, BG=beige).



SMM-U01E-XX

## UNICOM OWS+™ Patch Panel

• 4-pair cables from each port are grouped together on either top or bottom • Optional designation-label strips available in 6 different colors for each 8-port section (sold separately)



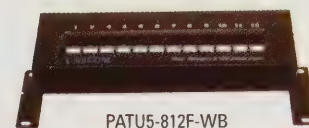
P/N	No. Ports	Wiring	Rack Space	Each
PATU5-180162-11 (1)	16	T568A	1	\$75.00
PATU5-180242-11 (2)	24	T568A	1	98.00
PATU5-180482-11 (3)	48	T568A	2	191.00
PATU5-180962-11 (4)	96	T568A	4	353.00
PATU5-180162-12	16	T568B	1	76.00
PATU5-180242-12	24	T568B	1	98.00
PATU5-180482-12	48	T568B	2	191.00
PATU5-180962-12	96	T568B	4	353.00

## Colored-Designation Strips

P/N	Color	Per Package	Each
PATU5-DS-BL	Blue	12	\$2.35
PATU5-DS-GN	Green	12	2.35
PATU5-DS-GY	Grey	12	2.35
PATU5-DS-RD	Red	12	2.35
PATU5-DS-YL	Yellow	12	2.35
PATU5-DS-WT	White	12	2.35

## UNICOM Front Termination 110 Jack Panels

• Front termination of 110 Connections  
• Available in 12 Ports • EIA/TIA 568B  
• Available with 1.75" standoffs.

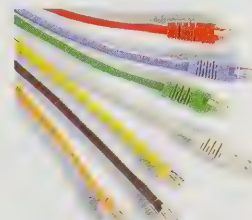


PATU5-812F-WB

P/N	Description	Each
PATU5-812F-WB	12 Port Wall Mount, Flush Mount T568B	\$75.40
PATU5-812F-LB	12 Port Wall Mount with standoffs T568B	80.00

## UNICOM Molded and Nonmolded UTP Patch Cords

• Crosstalk normally caused by kinked connections is now reduced with these new molded cables • Each system application or department can have its own color.



P/N	Description	Each
<b>Molded Jacket with Strain-Relief - Available in 5 Brilliant Colors</b>		
E5DD-C803-M*	Cat-5, 4-pair, RJ-45 plugs, 3 ft	\$2.15
E5DD-C807-M*	Cat-5, 4-pair, RJ-45 plugs, 7 ft	2.80
E5DD-C810-M*	Cat-5, 4-pair, RJ-45 plugs, 10 ft	3.25
E5DD-C825-M*	Cat-5, 4-pair, RJ-45 plugs, 25 ft	5.70
<b>Nonmolded Jacket - Available in 7 Brilliant Colors</b>		
E5DD-C803-S*	Cat-5, 4-pair, RJ-45 plugs, 3 ft	\$1.65
E5DD-C807-S*	Cat-5, 4-pair, RJ-45 plugs, 3 ft	2.30
E5DD-C810-S*	Cat-5, 4-pair, RJ-45 plugs, 3 ft	2.75
E5DD-C825-S*	Cat-5, 4-pair, RJ-45 plugs, 3 ft	5.05

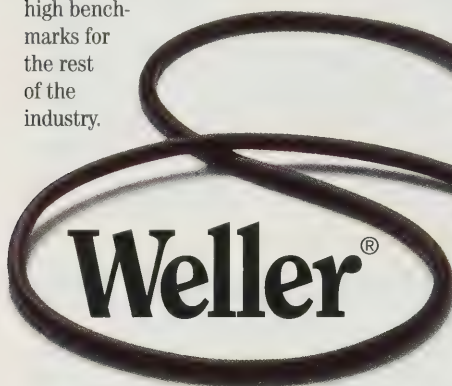
\* To specify a jacket color, add the following appropriate letters to the end of the P/N number. Molded (BL=blue, GR=green, RD=red, WH=white, BK=black). Nonmolded (BL=blue,, OR=orange, YL=yellow, blank=white, GN=green, RD=red, BK=black)



# The MICROTOUCH PLUS™ sets astonishingly high benchmarks for the rest of the industry

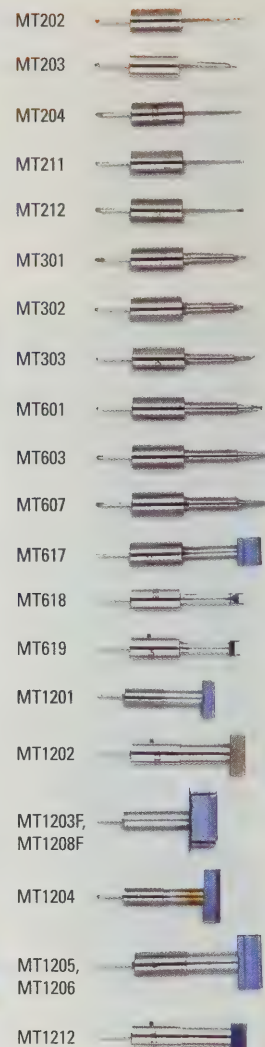
## WELLER MICROTOUCH PLUS Soldering Station

This unit has the highest thermal capacity of any WELLER soldering station to date. In multiple tests, the MICROTOUCH PLUS not only outperformed the competition, but also set astonishingly high benchmarks for the rest of the industry.



MT1500

competition's tips • Over 50 styles and sizes of tips are available • A patented flex SMT tip grips and releases components without the aid of any tools • Tips can be interchanged in seconds • Temperature range: 400 °F–850 °F, control setting resolution:  $\pm 1$  °F • Stability:  $\pm 10$  °F • Designed to reduce user fatigue and increase productivity • Large, easy-to-read LED display • Iron weight: 1 oz • Meets all MIL-SPECS • ESD-safe • Fast heat-up time • Greater thermal capacity • Lower handle temperature • A temperature lockout version, the MT1500L, is also available • UL Listed



Go from using the smallest diameter tip (.010") to the largest (SMT) tip within seconds, without ever using a tool. And because their tips work within a user-specified range of temperatures, you don't have to maintain a large, costly inventory like you do with some other stations.

• The TOUCH feature lowers the temperature of the iron when not in use, extending tip life and reducing heat loss—tips last up to 3 times longer than the

P/N	Description	1-5	6+
MT1500	MICROTOUCH PLUS soldering station, 120 V, tip not included	\$598.20	\$530.40
MT1500L	MICROTOUCH PLUS station with temperature lockout, 600°, 700°, 800° thermolock keys included, tip not included	598.20	530.40
<b>Conical</b>			
MT202	Needle, .030" x 1.0" (L)	34.50	32.85
MT203	Needle, .030" x 1.0" (L), MIL-SPEC	46.20	44.00
MT204	Needle, .022" x 1.0" (L), non-wet	28.25	26.90
MT220	Needle, .030" calibration tip, 200 Series	63.30	60.25
MT302	Conical, sharp, .015" x .200" (L)	41.10	39.15
MT606	Conical, sharp, .016" x .530" (L)	41.10	39.15
MT609	Conical, sharp, .023" x .600" (L)	41.10	39.15
MT613	Conical, sharp, .020" x .530" (L)	41.10	39.15
MT615	Conical, sharp, .030" x .390" (L)	41.10	39.15
<b>Conical, Bent</b>			
MT303	Conical, bent, 30°, .015" x .320" (L)	41.10	39.15
MT603	Conical, bent, 30°, .020" x .600" (L)	41.10	39.15
MT605	Conical, bent, sharp, 30°, .016" x .560" (L)	41.10	39.15
MT612	Conical, bent, 30°, .050" x .880" (L)	41.10	39.15
<b>Chisel</b>			
MT611	Chisel, .060" x .610" (L)	41.10	39.15
MT614	Chisel, .100" x .190" (L)	41.10	39.15

P/N	Description	1-5	6+
<b>Bevel</b>			
MT607	Bevel, 30°, .020" (diam.) x .580"	\$41.10	\$39.15
MT608	Bevel, 30°, .040" x .560"	41.10	39.15
MT616	Bevel, 30°, .032" x .560"	41.10	39.15
<b>Screwdriver</b>			
MT211	Screwdriver, .045"(W) x .015" (thick) x 1.0" (L)	39.80	37.90
MT212	Screwdriver, .045" (W) x .005" (thick) x 1.0" (L), non-wet	45.55	43.40
MT221	Micro-screwdriver, .031" (W) x .010" (thick) x 1.0" (L)	43.95	41.85
MT301	Screwdriver, .047" x .200" (L)	41.10	39.15
MT320	Screwdriver calibration tip, 300 Series	63.30	60.25
MT601	Screwdriver, .070" x .385" (L)	41.10	39.15
MT602	Screwdriver, .100" x .390" (L)	41.10	39.15
MT604	Screwdriver, .060" x .390" (L)	41.10	39.15
MT610	Screwdriver, .200" x .350" (L)	41.10	39.15
MT620	Bevel, 30 degrees	41.10	39.15
<b>PLCC's</b>			
MT1203F	Quad PLCC-44, .700" (sq.), flex leg	138.90	132.25
MT1208F	Quad PLCC-68, 1.000" (sq.), flex leg	138.90	132.25
MT1212	Quad PLCC-18, .335" x .535"	71.55	68.15
MT1202	Quad PLCC-20, .410" (sq.)	71.55	68.15
MT1201	Quad PLCC-28, .500" (sq.)	71.55	68.15
MT1204	Quad PLCC-32, .500" x .600"	86.95	82.80

P/N	Description	1-5	6+
<b>SOIC</b>			
MT619	SOIC-14/16, .200" (W) x .410" (L)	\$59.95	\$57.10
MT621	SOIC-8, .200" (W) x .180" (L)	59.95	57.10
MT1207	SOIC-20, .375" (W) x .520" (L)	86.95	82.80
MT1210	SOIC-28, .375" (W) x .720" (L)	59.95	57.10
MT1211	SOIC-24, .375" (W) x .620" (L)	59.95	57.10
<b>SIP</b>			
MT617	SMT, blade, .410" (L)	86.95	82.80
MT1205	SMT, blade, .820" (L)	85.40	74.85
MT1206	SMT, blade, .620" (L)	71.55	68.15
<b>SOJ</b>			
MT1209	SOJ-28, .340" (W) x .740" (L)	59.95	57.10
<b>CHIP</b>			
MT618	CHIP 1206/1210, .135" (W) x .070" (L)	53.25	50.70
MT622	CHIP 0805, .090" (W) x .060" (L)	53.25	50.70
MT624	CHIP SOT 23, .068" (W) x .100" (L)	53.25	50.70
MT625	CHIP 1808/1812, .190" (W) x .090" (L)	53.25	50.70
MT626	Quad PLCC 18, .303" (W) x .105" (L)	53.25	50.70
<b>SOMC</b>			
MT623	SOMC-16, .270" (W) x .450" (L)	53.25	50.70
<b>QFP</b>			
MT1213	QFP-64/80, .680" x .915"	107.95	102.80



## From the bench SOLDERING TOOLS

Industrial and professional soldering can be accomplished with tools ranging from plug-in "stick irons" to very sophisticated "soldering stations."

Stick irons usually offer a fixed temperature, no ESD protection, a small variety of tip sizes and configurations, and the stands must be purchased separately. Soldering stations, on the other hand, offer precise temperature control, ESD protection, MIL-STD compliance, integrated iron stands, a variety of handpiece sizes, and very broad range of tip sizes and shapes.

To fully protect today's components, soldering stations should at minimum be ESD-safe and meet MIL-STD specifications. They should display temperature either by a control dial or by a digital readout, and they should have a calibration capability to compensate for different tip masses and handpieces. More sophisticated features on soldering stations might include: operator lockout, timed temperature setback, touch-to-heat handpieces, digital calibration, display change (°F to °C), and the versatility to use tips that range from micro-fine to large 4-sided configurations.

We offer a wide variety of soldering tools—to fit all your needs.

### WELLER EC Series Soldering Stations

The EC1002 and EC2002M1 soldering stations are designed for production soldering where variable temperature and electronic control is required. Both stations can be used for standard mixed-technology soldering and SMT board work. The EC2002M1 has a 3-digit LCD. Both stations give you the option of using the 40-W EC1201 iron, 42-W EC1503A high-output iron, or the 20-W EC1302A micro iron.

The EC2002M1 with the optional WCM1 calibration unit enables calibration at the bench, temperature lock-out, and automatic set-back to 350 °F during periods of inactivity—to extend tip life. A single WCM1 can be used to set operating parameters for an infinite number of EC2002M stations.

- ESD-safe • Temperature-controlled • 350 °F–850 °F,  $\pm 10$  °F (6 °C) at idle • Meets all MIL-SPECS
- UL Listed



P/N	Description	1-5	6+
EC10021	Dial power unit, EC1201A iron, ETA tip, and stand	\$237.40	\$210.50
EC10022	Dial power unit, EC1302A iron, EPH101 tip, and stand	237.40	210.50
EC10023	Dial power unit, EC1503A iron, EMA tip, and stand	252.40	223.75
EC2002M1	Digital display station, EC1201A iron, ETA tip, and stand	324.95	288.15
EC2002M2	Digital display station, EC1302A iron, EPH101 tip, and stand	324.95	288.15
EC2002M3	Digital display station, EC1503A iron, EMA tip, and stand	340.00	301.50
WCM1	Calibration unit for EC2002M stations	163.50	145.05

### WELLER Dual-Iron Variable-Control Station

This unit provides a lot more flexibility in the same footprint as a single station. You can use any combination of two irons at the same time—making it ideal for multiple-use situations like re-work and repair.

- Temperature controlled • 350 °F–850 °F,  $\pm 10$  °F (6 °C) at idle • Individual power switch and temperature dial
- Compatible with existing WELLER EC irons (sold separately) • Meets all MIL-SPECS • ESD-safe • UL Listed



P/N	Description	1-5	6+
DEC1001	ESD dual-iron station and 2 stands	\$237.15	\$210.25

### WELLER Irons for Above Stations

P/N	Description	1-11	12+
EC1201A*	40-W macro pencil with ETA tip	\$92.25	\$81.80
EC1204A*	54-W macro high-capacity pencil with ETA tip	92.25	81.80
EC1302A*	20-W micro pencil with EPH101 tip	92.25	81.80
EC1503A*	42-W high-output pencil with EMA tip	107.25	95.10
WT50	Thermal tweezers, 2 W x 25 W, 300 °F–850 °F operating temperature range	253.40	224.75
AK50	Stand for WT50	100.45	89.05

\*Sold separately

### EDSYN Microprocessor-Controlled Station

Thanks to its internal computer, the MCS100 lets you solder with the most accurate temperature control available. In addition to the features of the MCS100, the MCS100-S informs you of the amount of the soldering temperature that is being absorbed by the nearby parts.

- Microprocessor-controlled • Tip memory • Pre-set temperatures
- Locking program • Built-in temperature meter • Auto calibration • Meets all MIL-SPECS • ESD-safe
- UL Listed



P/N	Description	6+
MCS100	Master control system digital loner soldering system	\$962.05
MCS100-S	MCS100 with external temperature control and sensor and SDS100 docking system	1157.50

### WELLER THERMOLOCK® Stations

For soldering applications where fixed temperature is required, this soldering station's tip temperature is automatically set to within  $\pm 10$  °F when different temperature keys are inserted. For safety, the station powers down the iron to 350 °F if the key is removed while the unit is on.

- THERMOLOCK keys provide operator lockout
- Can be used with all 3 EC irons • Tip temperature automatically sets to within  $\pm 10$  °F with insertion of different THERMOLOCK keys • Meets all MIL-SPECS • ESD-safe • UL Listed

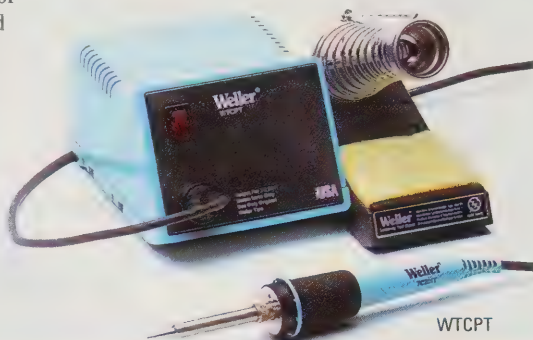


P/N	Description	1-5	6+
WTL1000-1	ESD station EC1201A, 40-W pencil, ETA tip, stand and keys	\$239.20	\$212.15
WTL1000-2	ESD station EC1302A, 20-W pencil, EPH101 tip, stand, and keys	239.20	212.15
WTL1000-3	ESD station EC1503A, 42-W pencil, EMA tip, stand and keys	254.40	225.65



## WELLER Controlled-Output Soldering Station

- Transformer-powered soldering station complete with macro-style, low-voltage, temperature-controlled soldering iron • Special "closed-loop" method of controlling maximum tip temperature to protect temperature-sensitive components • Power-unit housing features impact-resistant plastic for durability • Soldering iron has a quick-disconnect plug • Lighted on/off switch • Separate conductor grounds iron tip and terminates at third pin of power cord
- PT Series soldering tips come in a variety of shapes and sizes in 3 standard temperature ranges: 600 °F, 700 °F, and 800 °F
- UL Listed



P/N	Description	List	Each
WTCPT	Complete ESD soldering station with PTA7 tip	\$179.00	\$79.95
P/N	Description	1-5	6+
WTCPTFE	Soldering station with fume extracting handle	\$208.20	\$184.65

NOTE: Call for available iron attachment kits with fume extractor handle.

## Replacement Parts for the WTCPT

P/N	Description	1-11	12+
PU120T	ESD power unit for WTCPT, 120 V, with sponge and holder	\$107.60	\$95.40
TC201T	Soldering pencil with PTA7 tip	70.50	62.55
EC234	Heater (plug-in type)	14.25	10.70
SW60	Switch-assembly with spring	23.50	20.85
TC212	Cord-set with plug	19.05	16.90
BA60	Barrel-nut assembly	5.20	4.60
TC205	Sponge	1.55	.85
TC204	Iron holder with funnel	5.40	4.80
PH1201ESD	Iron stand	20.45	18.15
PL120	Plug/receptacle kit	7.45	6.60
TC218	Handle assembly	5.20	3.90

## WELLER Temperature-Controlled Station

Now you can get the quality, dependability, and reputation of a WELLER soldering station at a very competitive price.

- ESD-safe • Electronically-controlled, zero cross-circuitry • Variable control (550 °F–850 °F)
- Lightweight handpiece
- Compact, takes up less bench space • Reliable, long-lasting ceramic heating element
- Operates with all WELLER SMT tips
- Meets all MIL-SPECS



P/N	Description	List	Each
921ZX1	Temperature-controlled station	\$179.00	\$79.95

*Quick heat-up, fast recovery, and more reliable than ever*



## WELLER Silver Series Soldering Stations

The WELLER Silver Series is designed to maximize work space and give you 80 W of heat power when you need it.

Two new 80-W stations, the WS80 and WSD80, increase the ability to work on high-mass components where a greater controlled power is required. The WS80 has dial-control temperature settings from 300 °F to 850 °F. The WSD80 has a digital display of actual and preset soldering temperatures. The unique silver heating element and tip configuration in the WSP80 iron is more conductive so that the heat passes directly into the tip. As a result, the new patented WELLER low-mass tip has 10% faster recovery time when compared with conventional irons and tips. This iron is perfect for the production line where continuous soldering takes place.

The WSD80 digital display station is programmed using the WCB1 calibration unit. Sensitive components demand precise temperatures and timed connection sequences—the WCB1 calibration unit fulfills this requirement. The WCB1 also features temperature lock-out and set-back capabilities. The 2 new electronically controlled soldering stations are fully compatible with existing WELLER EC Series tools.

**WS80 station includes:** • PU80 power unit • WSP80 pencil • WPH80 holder • Analog control electronics • Antistatic housing • Dial-controlled temperature from 300 °F to 850 °F • Automatic tool recognition • Compatible with all WELLER accessories up to 80 W • Temperature locking via key-operated switch • Accuracy: ±2% • Includes soldering tool holder

**WSD80 station includes:** • PUD80 power unit • WSP80 pencil • WPH80 holder • Digital control electronics • Antistatic housing • Dial-controlled temperature from 100 °F to 850 °F • Automatic tool recognition • Compatible with all WELLER accessories up to 80 W • Calibration box may be connected for time set-back, locking functions (lock-out), and calibration • 3-position digital display for "Pre-set" and "Read Value" • Accuracy: ±2% • Includes soldering tool holder



P/N	Description	1-5	6+
WS80	Soldering station, 80-W	\$252.40	\$224.35
WSD80	Digital soldering station, 80-W	340.00	302.25
WCB1	Calibration unit	215.90	192.00
WSP80	Soldering iron (80 W with LTA tip)	107.25	95.35
WST20	Thermal stripping tool with support	380.65	337.50
WHPS	Heating plate	226.25	200.60
WT50	Heated tweezers	253.40	224.70

## Tips for the WSP80 Soldering Iron



P/N	Each
Choose P/N under desired tip	\$5.25



## EDSYN Temperature-Controlled Digital-Readout Soldering Stations

EDSYN brings you 2 choices for cost efficiency, high reliability, and digital accuracy: the 981 and 981M. Both use EDSYN's new slim-profile soldering tool and the 981M features a unique positive-grounding system. These stations bring you all the performance and reliability of EDSYN along with a new digital display and smaller hand tools.

- Backlit display for easy viewing
- EDSYN's smallest, coolest-running soldering tools
- Use standard or positive-grounding tips
- External calibration helps with ISO 9000 compliance
- Interchangeable soldering tools on the same base
- Smaller micro handle on the 981M



981



P/N	Description	1-5	6+
981	Digital-readout soldering station	\$349.00	\$331.55
981M	Digital-readout micro soldering station	379.00	360.05

## EDSYN LONER Temperature-Controlled Soldering Station

This station offers unsurpassed versatility. Its unique modular design allows for easy and economical conversion to fume extraction or hot air.

- Direct tip-heater configuration results in quick heat-up and recovery
- Advanced circuit design provides precise temperature control and external calibration
- Fume-extraction and hot-air conversion kits (sold separately) offer economy and unbeatable flexibility
- Accepts a wide variety of general-purpose tips
- New front-loading design makes tip changes faster and easier



971



Power Requirements	120 V, 60 Hz
Power Rating	15 W-220 W
Heater Rating	120 V, 95 W
Temperature Range	400 °F-800 °F (205 °C-427 °C)
Temperature Regulation	±6°/±3°
Tip-To-Ground Voltage Leakage Resistance	<2 mV/<2 Ω

P/N	Description	1-5	6+
971	Temperature-controlled soldering station	\$180.20	\$171.15
OPT823	Fume-extraction conversion kit	337.05	303.30
OPT825	SMT hot-air conversion kit	426.10	383.45

## EDSYN Soldering Stations

- ESD-safe
- Small light-weight handle
- Stable electronic temperature control from 400 °F-800 °F, ±6 °F
- External calibration
- Static safe
- Meets all MIL-SPECS
- UL Listed



951SX

952SX

P/N	Description	List	Each
951SX	ESD-safe soldering station, 70 W	\$445.95	\$79.99
P/N	Description	1-5	6+
952SX	Dual-station, independent temperature control, 70 W	\$264.60	\$251.35
RS199	Replacement sponge	1.60	1.55

## EDSYN High-Performance Soldering Station

- High-output PTC ceramic heating element
- Standard and SMD soldering tips
- Easy external-calibration capability
- Fast heat-up time (10 s)
- Temperature controlled (400 °F-800 °F)
- Meets all MIL-SPECS
- ESD-safe
- UL Listed



951HP

P/N	Description	1-5	6+
951HP	High-performance soldering station; 70 W	\$269.00	\$255.55
952HP	Dual high-performance soldering station; 70 W	408.80	388.35

## EDSYN Dual Soldering Station

This station features 2 soldering tools: 1 "stand-ard" SX-version and 1 high-performance HP-version. This provides you with the flexibility to meet the requirements of various applications.

- Temperature range: 400 °F-800 °F (both tools)
- External calibration
- Both tools always ready to use
- Meets all MIL-SPECS
- ESD-safe
- UL Listed



952HX

P/N	Description	1-5	6+
952HX	Dual soldering station, 120 V, 70 W/95 W	\$350.70	\$333.15

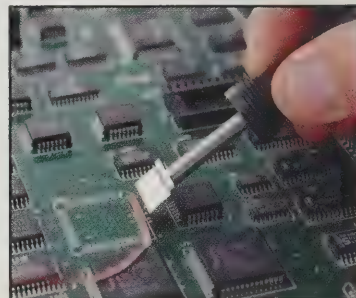


# METCAL soldering and desoldering stations

METCAL stations utilize a patented heating technology which provides instantaneous accurate tip temperatures and rapid thermal recovery with high-mass boards.

Heat is delivered to the tip through a pencil-like, ergonomic handpiece—with a minimal tip-to-grip distance. The MX Series offers SMT soldering and desoldering, while the SP440 offers through-hole desoldering (see page 70). A METCAL tip cartridge combines heating and sensing capabilities into a self-regulating cartridge—providing the user with high soldering throughput at low temperatures.

**METCAL**  
An OK International Brand



## METCAL MX Series SMARTHEAT® Soldering Stations

METCAL's new MX Series systems employ the patented SMARTHEAT technology in delivering heat to the soldering or desoldering tip. These systems power a wide variety of tips, providing for removal or attachment of the full range of SMT components, including chips, SOTs, SOICs, SOJs, PLCCs, and QFPs. The system is available in a single-handpiece configuration (MX-500S) or in a dual configuration that includes a TALON-tweezer handpiece (MX-500TS).

### METCAL MX-500S Soldering/SMT-Rework System

Includes: • 2-port switchable power supply (MX-500P)  
• Work stand (MX-WS4)  
• Handpiece with cord (MX-RM3E) • Sponge (AC-YS3)  
• Cartridge-removal pad (AC-CP2) • Tip cartridges for all systems sold separately



MX-500S-11

### METCAL MX-500TS TALON Soldering/SMT-Rework System

Includes: • 2-port switchable power supply (MX-500P)  
• Work stand (MX-WS5)  
• Handpiece (tweezer) with cord (MX-TALON) • Work stand (MX-WS4) • Hand-piece with cord (MX-RM3E)  
• Sponge (AC-YS3), 2 each  
• Cartridge-removal pad (AC-CP2), 2 each • Tip cartridges for all systems sold separately



MX-500TS-11

P/N	Description	Each
MX-500S-11	Soldering/SMT-rework system	\$650.00
MX-500P-11	2-port power supply only	555.00

P/N	Description	Each
MX-500TS-11	TALON/Soldering/SMT-Rework system	\$970.00

NOTE: Call for information on METCAL's full line of soldering accessories.

The power of METCAL SMARTHEAT together with the benefits of OK INDUSTRIES' focused convection ... in 1 package

MX-FCR-11



You cannot rework all components with 1 technology. To remove components quickly, easily, and safely, the METCAL conduction rework tools are ideal. The OK INDUSTRIES' FCR (focused convection rework system) utilizes a self-contained air source to regulate air flow and temperature. A semiautomatic feature for component removal and replacement can be used for controlled repeatability and safety. The integral vacuum pick-up ensures safe rework.

Three modes are available for the ultimate in control: manual, auto-remove, and auto-place. Nozzles are designed to focus heated air on component leads while minimizing heat to adjacent areas. Choose from convection or IR pre-heaters to pre-heat stubborn components. An optional adjustable board holder makes positioning and consistent results a snap.

P/N	Description	Each
MX-FCR-11	MX-500S system with FCR-2201 system and TALON SMT removal tool	\$2450.00
WSA	Stand (RTS-A) and closed board holder (RBH-A)	1400.00
WSB-1	IR pre-heater with stand (SMW-1101) and open board holder (RBH-B), 115 V	2000.00
WSC-1	Convection pre-heater with stand (SMW-2101) and open board holder (RBH-B), 115 V	3000.00
RBH-B	Open board holder	600.00



# Now you don't have to settle for second best in soldering systems

## Metcal SP200 Soldering System

With increased competition, companies of all sizes are being driven to cut costs. But you don't have to settle for second best—because the SP200 delivers 100% METCAL Direct Power performance. And just as in all METCAL SMARTHEAT systems, no calibration is required.

The SP200 is an ideal choice for both large and small companies. You can put it on benches for through-hole soldering and surface-mount touch-up and put a METCAL MX500 surface-mount rework system on the benches of your SMT rework operators.

SP200 system includes: • SP-PW1 power supply • SP-HC1 handpiece with cord • SP-WSK1 work stand with sponge • STSS-CP2 cartridge-removal pad • Tip cartridges sold separately

SP200 accessories:

- SP-HC1 solder handle/cord
- SP-WSK1 solder work stand with YS3 sponge
- SP-WSC replacement cradle for SP-WSK1
- AC-YS3 sponge for WSK1/WSK2



SP200-11

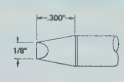



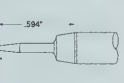
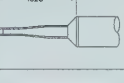


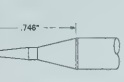
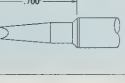

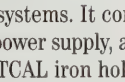
## SSC Soldering Cartridges for the SP200



For maximum performance, pick a tip geometry which maximizes contact with the connection. A flat, blunt tip transfers more heat than a fine, pointed one. Choosing the largest tip possible improves performance (enabling you to get more heat at lower temperatures) and enhances tip life.

Each METCAL tip cartridge is designed for high power delivery, so you can often solder 100 °F or more lower than with a conventional iron. For most applications, a 600 Series tip cartridge provides enough power and flexibility to do the job. Switch to a 700 Series only where absolutely necessary—for example, when working with heavy ground planes. When working with no-cleans or thermally sensitive applications, METCAL's 500 Series tip cartridges are an excellent choice.

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Description	P/N	Each
 High power—for medium-to-heavy loads where access is not a problem	<b>1/8" 90° Chisel</b> 500 Series: <b>SSC-513A</b> 600 Series: <b>SSC-613A</b> 700 Series: <b>SSC-713A</b>	\$16.95
 General-purpose—for medium-to-heavy loads requiring extra length	<b>3/32" 30° Chisel</b> 500 Series: <b>SSC-536A</b> 600 Series: <b>SSC-636A</b> 700 Series: <b>SSC-736A</b>	16.95
 The SSC-637A is recommended as a first tip cartridge for a METCAL system	<b>1/16" 30° Chisel</b> 500 Series: <b>SSC-537A</b> 600 Series: <b>SSC-637A</b> 700 Series: <b>SSC-737A</b>	16.95
 A finer SSC-x37A—good for medium-to-light through-hole and general surface-mount touch-up	<b>3/64" 30° Chisel</b> 500 Series: <b>SSC-538A</b> 600 Series: <b>SSC-638A</b> 700 Series: <b>SSC-738A</b>	16.95
 Good for a variety of light soldering tasks—the SSC-625A should be your first choice for SMT touch-up	<b>1/32" 30° Chisel</b> 500 Series: <b>SSC-525A</b> 600 Series: <b>SSC-625A</b> 700 Series: <b>SSC-725A</b>	19.95
 For light-duty applications requiring extra length	<b>1/32" Conical, Sharp</b> 500 Series: <b>SSC-501A</b> 600 Series: <b>SSC-601A</b> 700 Series: <b>SSC-701A</b>	19.95
 Long-reach chisel multipurpose tip cartridge for hard-to-access areas	<b>1/16" 60° Chisel</b> 500 Series: <b>SSC-542A</b> 600 Series: <b>SSC-642A</b> 700 Series: <b>SSC-742A</b>	19.95
 Versatile fine-point tip cartridge for SMT touch-up or fine wire applications—not for general through-hole work	<b>1/64" Conical, Sharp</b> 500 Series: <b>SSC-522A</b> 600 Series: <b>SSC-622A</b> 700 Series: <b>SSC-722A</b>	19.95
 A bent SSC-x22A—good for SMT touch-up—not for general through-hole work	<b>1/64" Sharp (Bent 30°)</b> 500 Series: <b>SSC-526A</b> 600 Series: <b>SSC-626A</b> 700 Series: <b>SSC-726A</b>	16.95
 Long-reach chisel—a multipurpose tip for heavy through-hole loads in hard-to-access areas	<b>3/32" Long Chisel</b> 500 Series: <b>SSC-546A</b> 600 Series: <b>SSC-646A</b> 700 Series: <b>SSC-746A</b>	16.95
 Designed for drag soldering of fine-pitch parts—both gull-wing and J-lead	<b>1/64" Conical, Sharp</b> 500 Series: <b>SSC-545A</b> 600 Series: <b>SSC-645A</b> 700 Series: <b>SSC-745A</b>	19.95
 An extended-length fine-point tip cartridge for SMT touch-up or fine wire—not for general through-hole work	<b>Multi-lead Speed Solder</b> 500 Series: <b>SSC-539A</b> 600 Series: <b>SSC-639A</b> 700 Series: <b>SSC-739A</b>	32.00

## OK INDUSTRIES SA-400 Series High-Powered Soldering Stations

The versatile SA-400 Series stations lead the field in soldering, touch-up, and SMT-rework applications.

The powerful, long-life ceramic heating element, combined with a closed-loop temperature control, result in a quick, efficient response.

- ESD-safe construction • Temperature range: 446 °F–850 °F • Variable temperature control • Accepts SAI-640 (40-W iron), SAI-690 (90-W iron), or SAI-644 (SMT tweezer rework tool) • Available with fume-extraction handpiece



SA-441EC

P/N	Handpiece	Input Voltage	Handpiece Output	Fume Extraction Handpiece	Each
<b>SA-441EC</b>	SAI-640 micro iron	115 V/60 Hz	40 W/24 V	—	<b>\$170.00</b>
<b>SA-441EXC</b>	SAI-640 micro iron	115 V/60 Hz	40 W/24 V	Yes	<b>190.00</b>
<b>SA-491EC</b>	SAI-690 micro iron	115 V/60 Hz	90 W/24 V	—	<b>170.00</b>
<b>SA-491EXC</b>	SAI-690 micro iron	115 V/60 Hz	90 W/24 V	Yes	<b>190.00</b>
<b>SA-481EC</b>	SAI-644 SMT tweezer	115 V/60 Hz	80 W/24 V	—	<b>300.00</b>

## VIRTUAL INDUSTRIES TIP-MANAGEMENT SYSTEM™ for METCAL® Stations

This tip-saving unit is designed to enhance the METCAL soldering systems. It consists of a base unit for the METCAL power supply, an electric-eye sensor (installed in the METCAL iron holder), and a power cord.

- Extends life of tips from 2 to 5 times
- Tip-preheat mode idles temperature down when iron is in holder • Automatic 30-min turn-off when the station is not in use • Provides full heat on demand
- Reduces oxides on tips • METCAL station not included



TMS4000-ST

P/N	Description	Each
<b>TMS4000-ST</b>	Tip-management system	<b>\$295.00</b>

METCAL is a registered trademark of Metcal, Inc.



## ANTEX Miniature SMD Soldering Irons

- 15 W • 115 V
- Tip temperature: 650 °F–700 °F (343 °C–371 °C)



P/N	Description	Each
C/3U	3-wire grounded flexible cord and 3-prong molded plug	\$21.95
C/2	2-wire cord and 2-prong molded plug (not grounded)	21.45

## ANTEX Soldering Iron, Model G

- 18 W • 115 V • Tip temperature: 700 °F–750 °F (371 °C–399 °C)

P/N	Description	Each
G/3U	3-wire grounded flexible cord and 3-prong molded plug	\$22.25
G/2	2-wire cord and 2-prong molded plug (not grounded)	21.75

## ANTEX Series 140 Tips for Models C and G

P/N	Description	Dimension	Each
6-NS	Spade, nickel-plated	3/64"	\$1.90
6-IS	Spade, iron-plated	3/64"	2.90
6-IC	Chisel, iron-plated	3/64"	2.90
6-NC	Chisel, nickel-plated	3/64"	1.90

## WELLER Controlled-Output Soldering Irons

Select the temperature, 600 °F, 700 °F, or 800 °F, by simply changing tips. Use this tool with a WELLER soldering-iron stand (PH and SF Series) to make a complete soldering station.

- Portable • Plug-in heating element
- 6' cord
- UL Listed



P/N	Description	List	Each
W60P	60-W pencil, 2-wire CT5A7 tip		\$61.15
W60P-3	60-W pencil, 3-wire CT5A7 tip		66.45
W100PG	100-W pencil, 2-wire CT6F7 tip		59.15
W100P-3	100-W pencil, 3-wire CT6F7 tip		71.60
PH60	Stand for W60		19.20
PH100	Stand for W100		21.70
TC205	Replacement sponge		1.55

## WELLER Standard Series Modular Soldering Irons

Because WELLER provides interchangeable handles, heaters, and tips, you can meet the needs of custom applications and maintenance.

- Cool soft-touch grip
- 6' cord
- UL Listed



P/N	Description	Each
7400	3-wire grounded handle, standard cord	\$19.50
7500	3-wire grounded handle, burn-resistant cord	28.20
7760	2-wire red handle	13.25
7770	2-wire blue handle	13.20
537-S	23-W heater for thread-on tips (700 °F)	16.70
1235-S	33-W heater for thread-in tips (800 °F)	18.75
4033-S	45-W heater with integral long chisel tip (1,000 °F)	26.20
4035-S	45-W heater for thread-in tips (900 °F)	21.10
4037-S	45-W heater for thread-on tips (900 °F)	21.25
37	50-W heater for thread-on tips (1,000 °F)	30.55

## WELLER PORTASOL® Professional Portable Soldering Iron and Heating Tool

This butane-powered tool is a must for the service technician's kit. It can be used to solder, heat shrink, cut rope, and perform other open-flame applications. The PSI100K kit includes the iron, sponge, stand, 2 soldering tips, hot blower, hot-knife tips, and storage case.

- Stainless-steel body • Up to 125 W of power
- Heats up to 1,076 °F • Runs up to 2 h
- Fuel-level window



P/N	Description	Each
PSI100	PORTASOL cordless soldering tool	\$60.70
PSI100K	PORTASOL cordless soldering-tool kit	80.40
WB1	2.1-oz butane cylinder	2.60
WB2	1-oz butane cylinder	2.20



We provide reduced pricing on large-quantity orders.



Products with this symbol are some of our most popular and best priced.



Products with this symbol only ship via surface, due to weight or size.

See our solder-tip selection on pages 59–65.

## WELLER PRO PLUS™ Irons

The new PRO PLUS series of production irons has a high thermal capacity. They do not require tools to replace the heating elements or to change the wattage.

- Cool, comfortable cushion-grip
- Quick-change heating element
- Wide range of long-lasting plug-in style tips
- Perfect for high-speed production • 40 W, 60 W, and 80 W available in straight or hatchet style
- UL Listed



P/N	Description	Each
WP40S	40-W iron without tip, straight	\$35.90
WP60S	60-W iron without tip, straight	36.75
WP60H	60-W iron without tip, hatchet	44.15
WP100S	80-W iron without tip, straight	43.75
WP40SMOD	40-W heater, straight	19.85
WP60SMOD	60-W heater, straight	21.45
WP60HMOD	60-W heater, hatchet	22.65
WP100SMOD	80-W heater, straight	30.75

NOTE: All heating elements are interchangeable.

## DENON Variable-Temperature Iron

The combination of a newly designed high-capacity 200-W ceramic heater and a quick-heat control circuit provide unparalleled quick-heat buildup and prompt recovery. This compact and lightweight unit has capacity equal to a station-type soldering iron.

- Ensured ESD prevention
- New long-life tip incorporating P. W. B. (Pressure-Welded Bonding) technology and a double-thickness chrome coating (500-micron)



P/N	Description	Each
SS-8200	80-W variable-temperature soldering iron	\$135.00
ST-2A	Tool stand	26.00
81-01-01	Conical, standard tip	7.25
81-01-02	Conical, fine tip	7.25
81-01-04	2-mm flat-blade tip	7.25
81-01-05	2.5-mm screwdriver tip	7.25

## EDSYN Constant-Temperature Soldering Tool

- Maintains a constant temperature
- Lightweight and static safe • Grounded 3-prong plug
- 120 V, 30 W • Uses LT Series tips • Tips are interchangeable with the 951SX



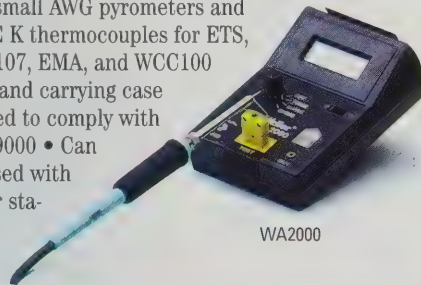
P/N	Description	Each
CL1484	Constant-temperature soldering tool	\$43.70



# Put your stations to the test

## WELLER Soldering-Iron Analyzer

- For testing soldering stations in compliance with DOT-2000 • Accurate and portable with a battery life of 50 hours • LCD read-out in °F and °C • Tests tip temperature, tip-to-ground resistance, and tip-to-ground noise • Comes with large and small AWG pyrometers and TYPE K thermocouples for ETS, EPH107, EMA, and WCC100 tips; and carrying case
- Used to comply with ISO-9000 • Can be used with other stations



WA2000

P/N	Description	1-3	4+
WA2000	Soldering-equipment analyzer	\$637.50	\$565.00

# Fast, accurate tip-temperature readings

## EDSYN Tip-Temperature Measuring Systems

The MS410/MS412 systems are designed to provide accurate, repeatable, and reliable temperature readings of soldering iron tips. They are also useful for a variety of other applications.

The MS412 comes with a T1680 temperature meter and an SDS100 sensor docking system which includes 2 "K"-type temperature probes (a TP795 for measuring soldering tip temperature and a TP791 small-surface temperature probe). The MS412 also includes an FX635 fixture for holding EDSYN soldering tools while measuring temperature.

The MS410 is identical to the MS412 with the exception of the FX635 tool holder.

With the addition of optional temperature sensors, the MS410/412 can be used to monitor and check temperatures on

solder pots (TP792 submersible probe) and large components (TP794 large area surface probe).



MS410

P/N	Description	1-3	4+
MS410	Temperature meter	\$419.70	\$398.75
MS412	Temperature meter	419.70	398.75

# Soldering tips

## Tips to Help You Select the Right Soldering-Tip Shape

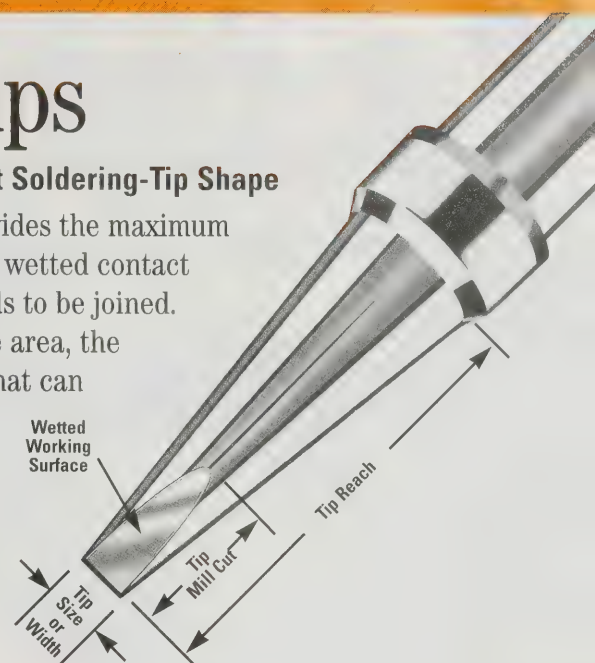
1. Select the tip shape which provides the maximum amount of contact between the wetted contact surface of the tip and the metals to be joined.

The greater the contact-surface area, the greater is the amount of heat that can be efficiently transferred to the solder-joint members—for a quality joint in the shortest amount of time.

2. Select the shortest tip length, but one that still allows comfortable access to the work.

3. Select the largest diameter of tip, but one that can be practically used.

4. Minimize the use of tapered and turned-down tips.



## Weller® tips for WELLER irons



ETA tip shown

**WELLER ET Series**—For the EC1201A soldering iron on page 53.

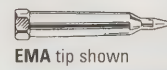
P/N	Shape	Tip Size	1-49	50-99	100+
ETA	Screwdriver	.06"	\$5.25	\$3.55	\$2.75
ETB	Screwdriver	.09"	5.25	3.55	2.75
ETC	Screwdriver	.12"	5.25	3.55	2.75
ETD	Screwdriver	.18"	5.25	3.55	2.75
ETH	Screwdriver	.03"	5.25	3.55	2.75
ETK	Long screwdriver	.04"	5.25	3.55	2.75
ETL	Long screwdriver	.07"	5.25	3.55	2.75
ETM	Long screwdriver	.12"	5.25	3.55	2.75
ETO	Long conical	.03"	5.25	3.55	2.75
ETP	Conical	.03"	5.25	3.55	2.75
ETR	Narrow screwdriver	.06"	5.25	3.55	2.75
ETS	Long conical	.01"	5.25	3.55	2.75



EPH101 tip shown

**WELLER EPH Series**—For the EC1302A soldering iron on page 53.

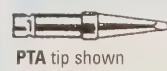
P/N	Shape	Tip Size	1-49	50-99	100+
EPH101	Micro point	.01"	\$5.55	\$3.65	\$2.80
EPH102	Bent conical	.03"	5.55	3.65	2.80
EPH103	Single flat	.03"	5.55	3.65	2.80
EPH105	Single flat	.04"	5.55	3.65	2.80
EPH106	Screwdriver	.06"	5.55	3.65	2.80
EPH109	Conical	.03"	5.55	3.65	2.80



EMA tip shown

**WELLER EM Series**—For the EC1503A soldering iron on page 53.

P/N	Shape	Tip Size	1-49	50-99	100+
EMA	Chisel	.06"	\$12.50	\$8.25	\$6.35
EMB	Chisel	.09"	12.50	8.25	6.35
EMD	Conical	.01"	12.50	8.25	6.35
EMF	Chisel	.04"	12.50	8.25	6.35
EMC	Conical	.01"	12.50	8.25	6.35
EMH	Chisel	.03"	12.50	8.25	6.35



PTA tip shown

**WELLER PT Series**—For the WTCPT, WTCPS, WTCPR, WTCPP, WTCPTF, WTCPTFE, TC201T soldering iron on page 54.

P/N	Shape	Tip Size	1-49	50-99	100+
PTA	Screwdriver	.06"	\$5.60	\$4.05	\$3.05
PTAA	Single flat	.06"	5.60	4.05	3.05
PTB	Screwdriver	.09"	5.60	4.05	3.05
PTBB	Single flat	.09"	5.60	4.05	3.05
PTC	Screwdriver	.12"	5.60	4.05	3.05
PTCC	Single flat	.12"	5.60	4.05	3.05
PTD	Screwdriver	.18"	5.60	4.05	3.05
PTDD	Single flat	.18"	5.60	4.05	3.05
PTE	Screwdriver	.33"	5.60	4.05	3.05
PTF	Conical flat	.03"	5.60	4.05	3.05
PTH	Screwdriver	.03"	5.60	4.05	3.05
PTK	Long screwdriver	.04"	5.60	4.05	3.05
PTL	Long screwdriver	.07"	5.60	4.05	3.05
PTM	Long screwdriver	.12"	5.60	4.05	3.05
PTO	Long conical	.03"	5.60	4.05	3.05
PTP	Conical	.03"	5.60	4.05	3.05
PTR	Narrow screwdriver	.06"	5.60	4.05	3.05
PTS	Long conical	.01"	5.60	4.05	3.05

NOTE: Add a 6 for 600 °F (315 °C), a 7 for 700 °F (371 °C), or an 8 for 800 °F (427 °C).



## On Our Solder Selection

Save time and money when ordering from our huge selection of solder and chemicals on pages 148–166.



# **PLATO® tips solder better because they're made better.**

When you see the name Plato® on a soldering tip you know you have the best. Plato® tips are precision made of oxygen free, high conductivity copper, heavily plated to offer significantly longer tip life.



Plato® makes thousands of replacement soldering and desoldering tips for these popular irons: Weller®, Hakko®, Pace®, O.K.® Industries, Hexacon®, Antex®, Oryx®, Air-Vac®, Ungar®, and many others. Plato® has been an innovator in soldering tip design and manufacture since 1954.

## **Plato® Shear Cutters**



170 and 175 Shears, Low cost, Ergonomically Designed, Comfortable, Lightweight Grips.

## **Plato® Tip•Tin Tip Tinner**



Plato® Tip•Tin TT-95 Lead Free – It Retins Oxidized Tips Safely/Quickly.

## **Plato® Solder Pots**



SP-500T and SP-101 Precision and General Purpose Solder Pots. Temperature Control to 925° F (496° C).

**Please see pages 61, 63, 64, 66, 71, 124 & 177 for our products.**

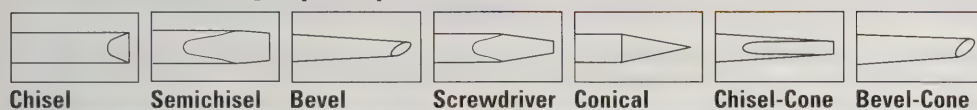
**For additional information please visit the @Once web site at [www.4atonce.com](http://www.4atonce.com) or call (800) 261-9602, Ext. 4002**

Plato Products is a recognized world leader in the manufacture of long life, high quality, soldering tips. Through its research and 40 years experience in the design and manufacture of long life tips, Plato has established itself as a leader in soldering tip innovation. Plato has consistently set the mark for quality to which other manufacturers strive to achieve. This tradition continues today.

**PLATO PRODUCTS, INC., INDUSTRY, CA, U.S.A.**



## Standard Soldering-Tip Shapes



Chisel Semichisel Bevel Screwdriver Conical Chisel-Cone Bevel-Cone



### Help Is Just a Phone Call Away

If you need assistance with ordering or want information on the other tip sizes and configurations that are available, just give us a call.

## PLATO tips for WELLER stations



PLATO is the leader in replacement tips. They use the best materials available and use the latest state-of-the-art manufacturing methods. Their tips meet or exceed the original manufacturer's specifications. Please use the PLATO part number when ordering.

For the WELLER 921ZX1 on page 54. Also for the WELLER 9911AS, 2110AS, and UTC-Series specifications.

PLATO P/N	WELLER P/N	Shape	Tip Size	1-49	50-99	100+
UC-8801	9010	Conical	.015"	\$6.40	\$5.60	\$5.05
UC-7001	9011	Conical	.035"	4.30	3.70	3.40
UC-6100	9012	Screwdriver	.050"	4.30	3.70	3.40
UC-7002	9013	Bevel	.065"	5.70	4.95	4.50
UC-7003	9014	Conical	.030"	5.70	4.95	4.50
UC-6101	9015	Chisel	.065"	5.70	4.95	4.50
UC-6110	9016	Chisel	.090"	5.70	4.95	4.50
UC-6102	9017	Conical	.030"	5.70	4.95	4.50
UC-6103	9018	Chisel	.050"	5.70	4.95	4.50
UC-7004	9019	Chisel	.030"	5.70	4.95	4.50
UC-8802	9050	Chisel	.020"	5.70	4.95	4.50
UC-6104	9051	Chisel	.120"	5.70	4.95	4.50
UC-7005	9052	Chisel	.030"	5.70	4.95	4.50

For the WELLER WTCPL, WTCPLN, WTCPR, WTCPS and WTCPT soldering stations with the TC201T soldering-iron handpieces on page 54.

PLATO P/N	WELLER P/N	Shape	Tip Size	1-49	50-99	100+
C-3039	PTA	Chisel	1/16"	\$3.60	\$3.15	\$2.90
C-3040	PTB	Chisel	3/32"	3.60	3.15	2.90
C-3036	PTC	Chisel	1/8"	3.60	3.15	2.90
C-1016	PTD	Chisel	3/16"	3.60	3.15	2.90
C-1017	PTE	Chisel	7/32"	3.60	3.15	2.90
C-3100	PTH	Chisel	1/32"	3.60	3.15	2.90
C-3865	PTJ	Chisel	1/32"	3.60	3.15	2.90
C-3043	PTK	Chisel	3/64"	3.60	3.15	2.90
C-3044	PTL	Chisel	5/64"	3.60	3.15	2.90
C-3102	PTM	Chisel	1/8"	3.60	3.15	2.90
C-4223	PTO	Conical	1/32"	3.60	3.15	2.90
C-462	PTP	Conical	1/32"	3.60	3.15	2.90
C-5101	PTQ	Conical	1/16"	3.60	3.15	2.90
C-1021	PTR	Chisel	1/16"	3.60	3.15	2.90
C-4794	—	Conical	.012"	3.60	3.15	2.90
C-494	PTS	Conical	1/64"	3.60	3.15	2.90
C-4309	PTT	Conical	.025"	3.60	3.15	2.90
C-0601	—	SMD tip	.023"	6.20	5.15	4.50
C-0551-7.5	—	SMD flow	.195"	4.70	4.45	4.25

NOTE: Add a 6 for 600 °F (315 °C), a 7 for 700 °F (371 °C), a 7.5 for 750 °F (399 °C), an 8 for 800 °F (427 °C), or a 9 for 900 °F (480 °C)

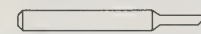
For the WELLER EC10021, EC20021, WTL1000, DTL-1000 and DEC1000 soldering stations with the EC1-201A soldering-iron handpieces on page 53.

PLATO P/N	WELLER P/N	Shape	Tip Size	1-49	50-99	100+
EW-303	ETA	Screwdriver	1/16"	\$3.60	\$3.15	\$2.90
EW-305	ETB	Screwdriver	3/32"	3.60	3.15	2.90
EW-307	ETC	Screwdriver	1/8"	3.60	3.15	2.90
EW-105	—	Screwdriver	7/32"	3.60	3.15	2.90
EW-103	ETD	Screwdriver	3/16"	3.60	3.15	2.90
EW-301	ETH	Screwdriver	1/32"	3.60	3.15	2.90
EW-302	ETJ	Long screwdriver	1/32"	3.60	3.15	2.90
EW-304	ETK	Long screwdriver	3/64"	3.60	3.15	2.90
EW-306	ETL	Long screwdriver	5/64"	3.60	3.15	2.90
EW-308	ETM	Long screwdriver	1/8"	3.60	3.15	2.90
EW-404	ETO	Long conical	1/32"	3.60	3.15	2.90
EW-403	ETP	Conical	1/32"	3.60	3.15	2.90
EW-101	ETR	Narrow screwdriver	1/16"	3.60	3.15	2.90
EW-402	ETS	Long conical	1/64"	3.60	3.15	2.90
EW-401	ETT	Conical	.025"	3.60	3.15	2.90
EW-511	—	Single flat	1/32"	3.60	3.15	2.90
EW-513	ETAA	Single flat	1/16"	3.60	3.15	2.90
EW-515	ETBB	Single flat	3/32"	3.60	3.15	2.90
EW-517	ETCC	Single flat	1/8"	3.60	3.15	2.90
EW-0602	—	SMD tip	.023"	5.70	5.20	4.95
EW-0574	—	SMD flow	.195"	4.60	4.35	4.20

For the WELLER EC1002, EC2002, WTL1000-2, DEC-1001 and DTL1000 soldering stations with the EC1-302A soldering-iron handpieces on page 53.

PLATO P/N	WELLER P/N	Shape	Tip Size	1-49	50-99	100+
RX-4762	EPH101	Micro-point	1/64"	\$3.15	\$2.95	\$2.75
RX-402	EPH102	Bent conical	1/32"	3.15	2.95	2.75
RX-513	EPH103	Single flat	1/32"	3.15	2.95	2.75
RX-404	EPH104	Bent conical	3/64"	3.15	2.95	2.75
RX-515	EPH105	Single flat	3/64"	3.15	2.95	2.75
RX-306	EPH106	Screwdriver	1/16"	3.15	2.95	2.75
RX-307	EPH107	Chisel	5/64"	3.15	2.95	2.75
RX-409	EPH109	Conical	1/32"	3.15	2.95	2.75
RX-401	EPH110	Conical	1/64"	4.05	3.60	3.35
RX-4763	EPH112	—	.010"	4.05	3.60	3.235
RX-4764	EPH111	—	.030"	3.15	2.95	2.75
RX-5567	—	Single flat	.020"	5.70	5.25	5.00
RX-5568	—	Single flat	.013"	5.70	5.25	5.00

## Weller tips for PRO PLUS™ soldering irons



WT159 tip shown  
All PRO PLUS tips are iron-plated • Long-lasting • Easy-to-replace plug-in style • Reduce operating costs

For the PRO PLUS Series WP40S, WP60S, and WP60H soldering-irons on page 58.

P/N	Shape	Tip Width	1-49	50-99	100+
WT159	30° flat	1/16"	\$3.20	\$3.05	\$2.85
WT313	Screwdriver	3/16"	3.20	3.05	2.85
WT324	Screwdriver	1/8"	3.20	3.05	2.85
WT358	Screwdriver	3/32"	3.20	3.05	2.85
WT397	Screwdriver	5/32"	3.20	3.05	2.85
WT399	Screwdriver	7/32"	3.20	3.05	2.85
WT417	Screwdriver	1/8"	3.20	3.05	2.85
WT451	Screwdriver	1/8"	3.20	3.05	2.85
WT463	Screwdriver	3/16"	3.20	3.05	2.85
WT513	Conical	1/8"	4.35	4.15	3.90
WT552	Screwdriver	3/16"	4.35	4.15	3.90
WT586	Screwdriver	1/8"	3.20	3.05	2.85
WT691	Screwdriver	1/16"	3.20	3.05	2.85
WT699	Screwdriver	1/16"	3.20	3.05	2.85
WT343	Conical	1/32"	3.20	3.05	2.85
WT773	Screwdriver	3/16"	4.35	4.15	3.90

1/16" point thickness for the PRO PLUS Series WP100S soldering iron on page 58.

P/N	Shape	Tip Width	1-49	50-99	100+
WT430	Round, flat	3/8"	\$5.65	\$5.40	\$5.10
WT470	Wide screwdriver	5/16"	5.65	5.40	5.10
WT151	Chisel	3/8"	5.65	5.40	5.10
WT108	Conical	1/16"	5.65	5.40	5.10
WT140	Narrow screwdriver	3/16"	5.65	5.40	5.10

## Weller tips for heaters and irons



PL-100 tip shown  
1/4" thread-on tips for the Standard Series heaters on page 58.

P/N	Shape	Tip Size	1-49	50-99	100+
PL-100	Precision electronic	.050"	\$4.70	\$4.10	\$3.75
PL-111	Pencil, plated	.030"	4.95	4.70	4.40
PL-113	Chisel, plated	.130"	4.95	4.70	4.40

For the 921ZX1 irons on page 54.

P/N	Shape	Tip Size	1-49	50-99	100+
9010	Precision point	.01"	\$9.00	\$8.00	\$7.50
9011	Spade	.03"	7.75	5.95	5.25
9012	Screwdriver	.05"	7.75	5.95	5.25

For the 921ZX1 irons on page 54. They have a high-capacity thermal-thrust, and should be used with a 9919 tip-retainer.

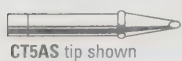
P/N	Shape	Tip Size	1-49	50-99	100+
9056	Conical	.02"	\$7.75	\$5.95	\$5.25
9060	Screwdriver	.1"	7.75	5.95	5.25
9919	Tip-retainer assembly		15.80	14.10	13.30
PSI1	Single flat	1/32"	9.10	8.65	8.10
PSI2	Single flat	3/32"	9.10	8.65	8.10

**FAX**

We accept fax orders 24 hours a day, 7 days a week.



## Weller® soldering tips



**WELLER CT Series**—For W60P and W100PG irons on page 58.

P/N	Description	Tip Size	Reach	1-49	50-99	100+
CT5A	W60P screwdriver	.062"	1.15"	\$6.25	\$4.50	\$3.35
CT5AS	W60P screwdriver	.062"	.62"	6.25	4.50	3.35
CT5B	W60P screwdriver	.093"	1.15"	6.25	4.50	3.35
CT5C	W60P screwdriver	.125"	1.15"	6.25	4.50	3.35
CT5D	W60P screwdriver	.187"	1.15"	6.25	4.50	3.35
CT5E	W60P screwdriver	.25"	1.15"	6.25	4.50	3.35
CT5R	W60P screwdriver	.062"	.87"	6.25	4.50	3.35
CT6C	W100PG screwdriver	.125"	1.37"	8.95	6.25	4.85
CT6D	W100PG screwdriver	.187"	1.37"	8.95	6.25	4.85
CT6E	W100PG screwdriver	.250"	1.37"	8.95	6.25	4.85
CT6F	W100PG screwdriver	.375"	1.37"	8.95	6.25	4.85

NOTE: Add a 6 for 600 °F (315 °C), a 7 for 700 °F (371 °C), or an 8 for 800 °F (427 °C)

## EDSYN "HP" and general-purpose soldering tips



**EDSYN High Performance**—For use only with MCS100, 951HP, 952HP, 952HX, and 1052HP soldering stations on pages 53 and 55.

P/N	Shape	Tip Width	Tip Length	1-49	50-99	100+
HP371	Fine spade	.03"	.57"	\$13.50	\$12.85	\$12.15
HP374	Probe	.05"	.57"	13.50	12.85	12.15
HP375	Standard spade	.06"	.57"	13.50	12.85	12.15
HP376	Short spade	.12"	.57"	13.50	12.85	12.15
HP395	Mid-length spade	.09"	.79"	13.50	12.85	12.15
HP441	Heavy-duty long wide spade	.20"	.55"	13.50	12.85	12.15
HP444	SMD mid-length fine spade	.04"	.83"	13.50	12.85	12.15
HP444-1	SMD angled mid-length fine spade	.04"	.75"	13.50	12.85	12.15

### Typical set-up for high-performance tips



**EDSYN General Purpose**—For use with 951SX, 952SX, CLI484 soldering stations on pages 55 and 58.

### EDSYN General-Purpose Spade Tips

P/N	Shape	Tip Width	Tip Length	1-49	50-99	100+
LT371	Fine spade	.03"	.55"	\$5.05	\$4.80	\$4.55
LT375	Standard spade	.06"	.48"	5.05	4.80	4.55
LT376	Short stubby spade	.12"	.48"	5.05	4.80	4.55
LT394	Extra-long spade	.07"	.93"	5.05	4.80	4.55
LT395	Mid-length stubby spade	.09"	.74"	5.05	4.80	4.55
LT425	Extra-long fine spade	.05"	.93"	5.05	4.80	4.55
LT431	Mid-length spade	.07"	.74"	5.05	4.80	4.55
LT424	Mid-length angle spade	.06"	.74"	5.05	4.80	4.55
LT444	SMD mid-length fine spade	.04"	.78"	5.05	4.80	4.55

### EDSYN General-Purpose Needle Tips

P/N	Shape	Tip Width	Tip Length	1-49	50-99	100+
LT374	Standard probe	.03"	.48"	\$5.05	\$4.80	\$4.55
LT381	Standard cone	.02"	.47"	5.05	4.80	4.55
LT382	Long cone	.02"	.62"	5.05	4.80	4.55
LT383	Thin mid-length needle-point	.04"	.78"	5.05	4.80	4.55
LT392	Extra-long needle-point	.01"	1.13"	5.05	4.80	4.55
LT429	Mid-length needle-point	.02"	.74"	5.05	4.80	4.55
LT439	Thin SMD probe	.03"	.50"	5.05	4.80	4.55
LT446	SMD probe	.03"	.48"	5.05	4.80	4.55
LT442	SMD mid-length probe	.04"	.74"	5.05	4.80	4.55

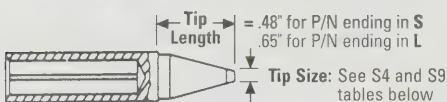
### EDSYN General-Purpose Angle-Face Tips

P/N	Shape	Tip Width	Tip Length	1-49	50-99	100+
LT398	Medium-angle face	.12"	.59"	\$5.05	\$4.80	\$4.55
LT399	Large-angle face	.16"	.59"	5.05	4.80	4.55
LT445	SMD-angle face	.03"	.48"	5.05	4.80	4.55
LT387	Standard-angle face	.06"	.48"	5.05	4.80	4.55

### EDSYN General-Purpose Angled Tips

P/N	Shape	Tip Width	Tip Length	1-49	50-99	100+
LT444-1	Angled SMD mid-length fine spade	.04"	.78"	\$5.60	\$5.30	\$5.05
LT602-1	Angled SMD short needle-point	.02"	.44"	6.00	5.70	5.40

## OK INDUSTRIES soldering and removal tips

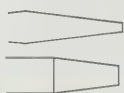


**OK INDUSTRIES S4 Series**—For SAI-640 MICRO IRON

P/N	Shape	Tip Size	1-49	50-99	100+
S4-105S	Chisel, 45°	.047"	\$6.50	\$6.25	\$6.00
S4-202B	Angled	.020"	7.95	7.60	7.20
S4-202S	Conical	.020"	7.95	7.60	7.20
S4-305S	Double flat	.047"	6.50	6.20	6.00
S4-306S	Double flat	.059"	6.50	6.20	6.00
S4-309S	Double flat	.094"	6.50	6.20	6.00
S4-201L	Conical	.015"	7.95	7.60	7.20
S4-305L	Double flat	.047"	6.50	6.20	6.00

**OK INDUSTRIES S9 Series**—For SAI-690 high power iron, SA-571, and SA-251

Part #	Shape	Tip Size	1-49	50-99	100+
S9-116S	Chisel, 45°	.157"	\$6.50	\$6.25	\$6.00
S9-203S	Conical	.031"	7.95	7.60	7.20
S9-305S	Double flat	.047"	6.50	6.20	6.00
S9-312S	Double flat	.118"	6.50	6.20	6.00
S9-320S	Double flat	.195"	6.50	6.20	6.00
S9-201L	Conical	.015"	7.95	7.60	7.20
S9-204L	Conical	.039"	6.50	6.20	6.00
S9-308L	Double flat	.079"	6.50	6.20	6.00




**OK INDUSTRIES S8 Series**—SOIC/discrete removal tips for SAI-644 SMTweezer

P/N	Shape	Tip Size	Reach	1-3	4-9	10+
S8-03	Point	.03"	.020"	\$53.25	\$51.00	\$48.20
S8-06	Point	.06"	.020"	53.25	51.00	48.20
S8-11	Blade	.110"	.040"	59.10	51.00	48.20
S8-16	Blade	.160"	.040"	59.10	57.00	54.00
S8-20	Blade	.20"	.040"	59.10	57.00	54.00
S8-50	Blade	.50"	.160"	70.95	68.00	65.25
S8-70	Blade	.70"	.160"	70.95	68.00	65.25


NOTE: All tips supplied as 2-piece set.





Help is Just a  
Phone Call Away.

 **New Product:** This symbol represents the industry's latest offerings.


 **We accept fax orders 24 hours a day, 7 days a week.**

 **We provide telephone technical assistance with your purchases.**

 **We provide reduced pricing on large-quantity orders.**

 **Products with this symbol are some of our most popular and best priced.**

 **We provide world-class quality ISO-9002-certified services and facilities.**

 **We are a full-service distributor with a broad range of the best products.**



# PLATO® soldering tips for HAKKO®, HEXACON®, and PACE®

**HAKKO**—For the HAKKO 926, 927, and 928 soldering stations with the M926 or 900M handpieces. Please use the PLATO part number when ordering.

PLATO P/N	Hakko P/N	Shape	Tip Size	1-49	50-99	100+
HS-5701	900M-T-1C	Micro spade	3/64"	\$4.50	\$4.20	\$3.95
HS-5702	900M-T-2C	Medium spade	5/64"	4.50	4.20	3.95
HS-5703	900M-T-3C	Large spade	1/8"	4.50	4.20	3.95
HS-5875	900M-T-4C	X-Large spade	5/32"	4.50	4.20	3.95
HS-2863	900M-T-O, 8D	Micro chisel	1/32"	4.60	4.30	4.05
HS-2796	900M-T-1, 2D and 900M-T-81	Micro chisel	3/64"	4.50	4.20	3.95
HS-2751	900M-T-1, 6D	Micro chisel	1/16"	4.50	4.20	3.95
HS-2752	900M-T-2, 4D	Chisel	3/32"	4.50	4.20	3.95
HS-2753	900M-T-3, 2D	Large chisel	1/8"	4.50	4.20	3.95
HS-4785	900M-T-B	Conical	.040"	4.50	4.20	3.95
HS-4787	900M-T-I	Needlepoint	1/64"	4.50	4.20	3.95
HS-0927	900M-T-K	SMD blade tip	1/4"	6.55	6.15	5.80
HS-4786	900M-T-LB	X-long needle	1/64"	4.50	4.20	3.95
HS-0923	900M-T-R	SMD chip tip	1/8"	5.70	5.25	5.00
HS-0924	900M-T-RT	SMD chip tip	5/64"	5.70	5.25	5.00
HS-4988	900M-T-SMD	Small needle	.008"	5.70	5.25	5.00
HS-8157	900-T-S5	Bent conical	1/64"	4.50	4.20	3.95
HS-0926	900M-T-1, 8H	Bent screwdriver	.070"	4.75	4.50	4.30
HS-6030	900M-T-1, 2LD	Screwdriver	3/64"	4.50	4.20	3.95
HS-6092	900M-T-2LD	Screwdriver	5/64"	4.50	4.20	3.95
HS-6093	900M-T-3, 2LD	Screwdriver	1/8"	4.50	4.20	3.95
HS-0925	900M-T-H	Bent screwdriver	9/64"	4.75	4.50	4.30
HS-1665	900M-T-83	Chisel	13/64"	6.55	6.15	5.80
HS-8175	900M-T-84	Cone	.008"	4.50	4.20	3.95
HS-0530	—	SMD flow tip	.128"	4.75	4.50	4.30
HS-0531	—	SMD flow tip	.195"	5.10	4.95	4.60

**HEXACON**—For the HEXACON THERM-O-TRAC® 1001 and 1002 and the SELECT-O-TRAC® 1003A/B and 1006A/B soldering irons. Please use the PLATO part number when ordering.

PLATO P/N	Hexacon P/N	Shape	Tip Size	1-49	50-99	100+
CH-3550	J101X	Chisel	1/8"	\$5.50	\$4.40	\$3.85
CH-3488	J202X	Chisel	3/32"	5.50	4.40	3.85
CH-3489	J301X	Screwdriver	1/16"	5.50	4.40	3.85
CH-3868	J912X	Chisel	1/32"	5.75	4.60	4.00
CH-4299	J917X	Long conical	1/32"	5.50	4.40	3.85
CH-3552	J940X	Screwdriver	5/64"	5.50	4.40	3.85
CH-4314	J954X	Small needle	.020"	5.75	4.60	4.00

Hexacon is a registered trademark of Hexacon Electric Co.

**PACE**—For the PACE IR-70 soldering irons. Please use the PLATO part number when ordering.

PLATO P/N	Pace P/N	Shape	Tip Size	1-49	50-99	100+
33-1144	1121-0359	Semi-chisel	1/64"	\$3.80	\$3.40	\$2.95
33-1146	1121-0361	Bent semi-chisel	.047"	3.80	3.40	2.95
33-1147	1121-0499	Screwdrivers	1/16"	3.80	3.40	2.95
33-1148	1121-0500	Bent chisel	.055"	3.80	3.40	2.95
33-1657	1121-0349	Chisel	1/16"	3.80	3.40	2.95
33-1658	1121-0358	Chisel	3/16"	3.80	3.40	2.95
33-6055	1121-0335	Chisel	1/16"	3.80	3.40	2.95
33-6056	1121-0414	Screwdrivers	1/8"	3.80	3.40	2.95
33-6057	1121-0360	Chisel	3/32"	3.80	3.40	2.95
33-6058	1121-0337	Chisel	1/8"	3.80	3.40	2.95
33-8141	1121-0357	Conical	1/64"	3.80	3.40	2.95
33-8142	1121-0336	Conical	1/32"	3.80	3.40	2.95
33-8143	1121-0363	Bent conical	.020"	3.80	3.40	2.95
33-5894	1121-0406	Bevel	1/8"	3.80	3.40	2.95
33-5895	1121-0490	SMD flow tip	.195"	3.60	3.25	3.05
33-5896	1121-0563	SMD tip	.06"	3.60	3.25	3.05
33-5897	1121-0564	Flow tip	.07"	3.60	3.25	3.05
33-5898	1121-0610	Flow tip	.09"	3.60	3.25	3.05
SMP-2001	1121-0302	SMD chip tip	3/32"	8.35	8.05	7.50
SMP-2002	1121-0303	SMD chip tip	145"	8.35	8.05	7.50
SMP-2003	1121-0304	SMD SOT tip	1/16"	8.35	8.05	7.50
SMP-2004	1121-0402	SMD blade tip	.350"	8.35	8.05	7.50
SMP-2005	1121-0305	SMD blade tip	.450"	8.35	8.05	7.50

Pace is a registered trademark of Pace, Inc.

**PACE**—The following 1/8" tips fit the PACE IR-25 and IR-70 soldering irons on. Please use the PLATO part number when ordering.

PLATO P/N	Pace P/N	Shape	Tip Size	1-49	50-99	100+
22-1627	1121-0130	Chisel	1/8"	\$3.05	\$2.65	\$2.40
22-2931	1121-0131	Screwdriver	1/16"	3.05	2.65	2.40
22-4927	1121-0132	Conical	.020"	3.05	2.65	2.40

## PLATO® Extended-Reach Tips for PACE® Irons

- Tips for the Pace SP-2A and IR-70 soldering irons

PLATO P/N	Pace P/N	Shape	Tip Size	1-49	50-99	100+
33-7101	1121-0528	Cone	.015"	\$3.80	\$3.40	\$2.95
33-7102	1121-0527	Cone	.031"	3.80	3.40	2.95
33-7103	1121-0533	Screwdriver	.062"	3.80	3.40	2.95
33-7104	1121-0529	Chisel	.093"	3.80	3.40	2.95
33-7105	1121-0530	Chisel	.125"	3.80	3.40	2.95
33-7106	1121-0531	Chisel	.187"	3.80	3.40	2.95
33-7107	1121-0532	Bevel	.125"	3.80	3.40	2.95

## PLATO® THERMO-DRIVE® Tips for PACE® Iron

- Tips for the Pace SP-2A and IR-70 soldering irons

PLATO P/N	Pace P/N	Shape	Tip Size	1-49	50-99	100+
33-3981	1121-0516	Cone	.015"	\$4.00	\$3.45	\$3.15
33-3982	1121-0526	Bent Cone	.015"	4.00	3.45	3.15
33-3983	1121-0524	Screwdriver	.047"	4.00	3.45	3.15
33-3984	1121-0525	—	.020"	4.00	3.45	3.15
33-3985	1121-0510	Screwdriver	.062"	4.00	3.45	3.15
33-3986	1121-0518	Screwdriver	.125"	4.00	3.45	3.15

Pace is a registered trademark of Pace, Inc.

We're Open  
24 Hours a  
Day, 365  
Days a Year.





## PLATO® soldering tips for HEXACON, AMERICAN BEAUTY, and ESICO

**PLATO 1/8" Tips**—For the HEXACON, AMERICAN BEAUTY, and ESICO soldering irons. Please use the PLATO part number when ordering.

PLATO P/N	AMERICAN BEAUTY P/N	ESICO P/N	HEXACON P/N	Shape	Tip Width	1-49	50-99	100+
20-851	524		HT104 HT511	Round Bevel	1/32"	\$4.70	\$3.45	\$3.00
22-449	510	240-102 240-111	HT222	Conical	1/32"	4.70	3.45	3.00
22-127	501	210-132 210-143	HT249	Short Chisel	1/8"	4.70	3.45	3.00
22-687	—	—	HT331	Conical	1/64"	4.70	3.45	3.00
21-175	503	211-105 211-127	HT361	Chisel	1/16"	4.70	3.45	3.00
22-142	502	210-107 210-114	HT376	Long Chisel	1/8"	4.70	3.45	3.00
22-315	271	—	HT477	Semi-chisel	3/32"	4.70	3.45	3.00
22-320	507	220-103 220-116	HT560 HT667	Screwdriver	1/16"	4.70	3.45	3.00
21-572	512	251-120 251-131	HT693	Bevel	1/16"	4.70	3.45	3.00
22-428	509	—	—	Conical	1/32"	4.70	3.45	3.00

Hexacon is a registered trademark of Hexacon Electric Co.

American Beauty is a registered trademark of American Electrical Heater, Inc.

Esico is a registered trademark of ESICO-TRITON.

**PLATO 3/16" Tips**—Tips for the HEXACON, AMERICAN BEAUTY, and ESICO soldering irons. Please use the PLATO part number when ordering.

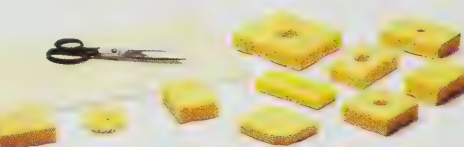
PLATO P/N	AMERICAN BEAUTY P/N	ESICO P/N	HEXACON P/N	Shape	Tip Width	1-49	50-99	100+
32-402	630	—	HT118	Conical	1/64"	\$5.45	\$4.05	\$3.50
33-395	619	320-136 320-144	HT190	Semi-chisel	1/8"	5.45	4.05	3.50
33-131	643	310-108 310-115	HT195	Chisel	3/16"	5.45	4.05	3.50
33-364	617	320-109	HT207	Semi-chisel	3/32"	5.45	4.05	3.50
33-464	621	340-107 340-114	HT214	Conical	1/32"	4.95	3.65	3.15
31-517	—	—	HT220	Bevel	1/16"	4.95	3.65	3.15
31-150	604	311-103 311-124	HT276	Chisel	1/16"	4.95	3.65	3.15
33-415	625	—	HT281	Conical	1/32"	4.95	3.65	3.15
32-168	605 607	312-105 312-116	HT474	Chisel	1/8"	5.45	4.05	3.50
32-660	626	342-112 342-119	HT479	Conical	1/32"	4.95	3.65	3.15
32-338	615	322-220 322-146	HT548	Screwdriver	1/16"	5.45	4.05	3.50
33-3396	—	—	HT892	Chisel	1/16"	5.45	4.05	3.50
30-1191	—	—	—	Chisel	3/32"	4.95	3.65	3.15
32-306	613	322-104 322-117	HT107	Screwdriver	3/32"	5.45	4.05	3.50

## PLATO® Tip-Cleaning Sponges

These sponges are manufactured with all natural materials to exacting specifications. Pure cellulose is used because it can hold many times its weight in water and because it's resistant to abrasion.

- Meets MIL-STD-2000 • Low sulfur content • Fine Porosity

P/N	Orig. Mfr's No.	Dimensions	1-49	50-99	100+
CS-5	AMERICAN BEAUTY 480S 4 pack	2.63" x 3.2"	\$2.60	\$2.35	\$1.95
CS-7	PLATO TW-555 TWH-444 7 pack used with Plato TW-555 or TWH-444	2.25" diam.	2.30	2.05	1.75
CS-9	HEXACON 8101, 8101C, 8121, 8121C, 10/pkg.	3.5" x 4.5"	8.95	8.05	6.75
CS-11	Used with PLATO VAC KITS and HOT GRIPS, 10/pkg.	2" x 2.63"	8.95	8.05	6.75
CS-12	METCAL YS1 sponge, 10/pkg.	1.7" x 2.7"	8.95	8.05	6.75
CS-14	WELLER 52241999, also used with WELLER WECP iron, 10/pkg.	2.15" x 2.75"	8.95	8.05	6.75
CS-17	PLATO CUT-TO-SIZE sponge sheet 1 pack	8.5" x 17"	12.55	11.40	9.50



P/N	Orig. Mfr's No.	Dimensions	1-49	50-99	100+
CS-36	HEXACON 8141, 8141C, WELLER DS-106, also used with HEXACON 893A holder, MV15/16, 10/pkg.	2.25" x 3.5"	\$8.95	\$8.05	\$6.75
CS-43	HAKKO 926-029B, also used with holder 926, 700, 10/pkg.	1.75" x 4.25"	8.95	8.05	6.75
CS-44	HAKKO 609-029, A-1024, WELLER, TC-205, UNGAR 9904-Also used with HAKKO holder 631, 607, 609, 10/pkg.	2.7" x 2.7"	8.95	8.05	6.75
CS-44M	CS-44 with multiple holes, 10/pkg.	2.7" x 2.7"	8.95	8.05	6.75
CS-47	METCAL STSS-YS3, UNGAR 455, UTC23, 10/pkg.	2.1" x 3.2"	8.95	8.05	6.75

## R&R LOTION Lead-Free Tip Tinner

Helps prolong tip life from the harsh soldering environments of no-clean and water-soluble fluxes.

- ESD safe • Lead-free
- No halides • Environmentally safe • Residue-free
- Available in 2 sizes



TIP-T

P/N	Description	Dia.	1-10	11-24	25+
TIP-T	Tip tinner, 1/2 oz.	1"	\$4.95	\$3.95	\$3.50
TIP-2	Tip tinner, 1-1/2 oz.	2"	6.95	6.40	5.95

## KESTER ULTRAPURE Tip Tinner

ULTRAPURE tip tinner replenishes the original coatings on soldering-iron tips while it removes excess oxides. Its consistent use helps to extend the useful life span of tips and reduces replacement costs. The irritating odor often found in similar products is minimized.



Tip-Tinner

P/N	Description	1-50	51-100	100+
Tip-Tinner	Tip tinner, .7 oz	\$3.00	\$2.75	\$2.60

## PLATO® Tip Tinner/Cleaner

PLATO's TT-95 lead-free tip tinner is fast, efficient, and safe.

- Lead-free • ESD-safe
- Environmentally safe
- Residue free • Easy to use • Fast response
- No halides



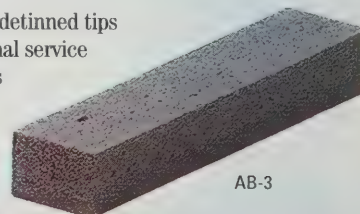
TT-95

P/N	Description	List	Each
TT-95	Tip tinner/cleaner .7 oz	\$4.80	\$3.10

## PLATO® Tip-Polishing Bar

You'll save money on soldering iron tips because you can use them longer. The inexpensive PLATO polishing bar restores detinned tips for additional service.

- Restores detinned tips for additional service
- Gives tips longer life



AB-3

P/N	Description	1-10	11-24	25+
AB-3	Polishing bar	\$10.15	\$8.20	\$6.85



Products with this symbol are some of our most popular and best priced.



We accept fax orders 24 hours a day, 7 days a week.



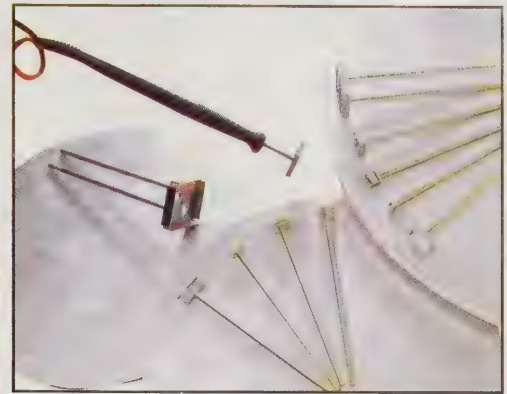
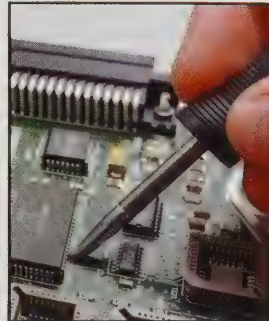
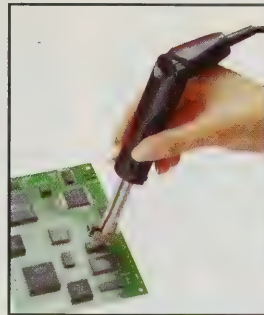
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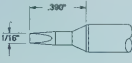



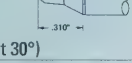


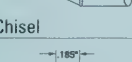
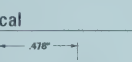

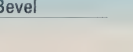
# METCAL

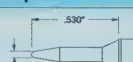
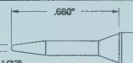
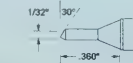
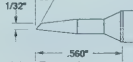
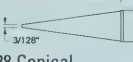
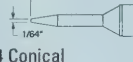

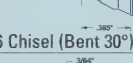



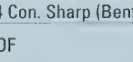
An OK International Brand

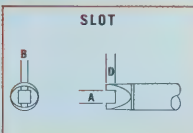
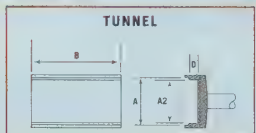
METCAL's SmartHeat® tip cartridges are the heart of every METCAL system. The cartridges utilize a self-regulating ferromagnetic heater to deliver just the right amount of heat to solder connections. A METCAL SmartHeat tip cartridge combines heating and sensing capabilities into a self-regulating cartridge. Since there are no separate sensors and controllers, there are no electronics to calibrate. METCAL tip cartridges provide continuous temperature control with no maintenance, providing the user with high soldering throughput at low temperatures. And, changing cartridges is quick and easy—no screws, no hassles.



## MX Series Tip Cartridges

P/N	Description	Application	Each
STTC-517		500° F	
STTC-017		600° F	
STTC-117	13/64 Ex.Lg. Chisel	700° F	\$21.95
STTC-536		500° F	
STTC-036		600° F	
STTC-136	3/32 30° Chisel	700° F	21.95
STTC-513		500° F	
STTC-013		600° F	
STTC-113	1/16 90° Chisel	700° F	21.95
STTC-537		500° F	
STTC-037		600° F	
STTC-137	3/64 30° Chisel	700° F	21.95
STTC-525		500° F	
STTC-025		600° F	
STTC-125	1/32 30° Chisel	700° F	21.95
STTC-522		500° F	
STTC-022		600° F	
STTC-122	1/64 Conical	700° F	21.95
STTC-526		500° F	
STTC-026		600° F	
STTC-126	1/64 (Bent 30°)	700° F	21.95
STTC-545		500° F	
STTC-045		600° F	
STTC-145	1/128 60° Bevel	700° F	21.95
STTC-542		500° F	
STTC-042		600° F	
STTC-142	1/16 60° Chisel	700° F	21.95
STTC-504		500° F	
STTC-004		600° F	
STTC-104	1/16 90° Chisel	700° F	24.95
STTC-512		500° F	
STTC-012		600° F	
STTC-112	1/16 Conical	700° F	21.95
STTC-502		500° F	
STTC-002		600° F	
STTC-102	1/16 Conical	700° F	21.95
STTC-535		500° F	
STTC-035		600° F	
STTC-135	1/16 30° Bevel	700° F	21.95

P/N	Description	Application	Each
STTC-501		500° F	
STTC-001		600° F	
STTC-101	1/32 Conical	700° F	\$21.95
STTC-507		500° F	
STTC-007		600° F	
STTC-107	1/32 Conical	700° F	21.95
STTC-524		500° F	
STTC-024		600° F	
STTC-124	1/32 30° Bevel	700° F	21.95
STTC-547		500° F	
STTC-047		600° F	
STTC-147	1/32 60° Bevel	700° F	21.95
STTC-543		500° F	
STTC-043		600° F	
STTC-143	3/128 Conical	700° F	21.95
STTC-506		500° F	
STTC-006		600° F	
STTC-106	1/64 Conical	700° F	21.95
STTC-514		500° F	
STTC-014		600° F	
STTC-114	1/64 60° Bevel	700° F	21.95
STTC-598		500° F	
STTC-098		600° F	
STTC-198	1/16 Chisel (Bent 30°)	700° F	21.95
STTC-599		500° F	
STTC-099		600° F	
STTC-199	3/64 Chisel (Bent 30°)	700° F	21.95
STTC-541		500° F	
STTC-041		600° F	
STTC-141	3/64 Con. Chisel (Bent 30°)	700° F	21.95
STTC-544		500° F	
STTC-044		600° F	
STTC-144	3/128 Con. Sharp (Bent 30°)	700° F	21.95
STTC-540		500° F	
STTC-040		600° F	
STTC-140	1/64 Con. Sharp (Bent 30°)	700° F	21.95
SMTC-x147	HOOF	Drag soldering	
SMTC-x167	MINI-HOOF	Drag soldering	
SMTC-x161	KNIFE		49.95

P/N	Description	Application	Each
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>SLOT</p> </div> <div style="text-align: center;">  <p>TUNNEL</p> </div> </div>			
SMTC-x60	.410" blade	Pad cleaning	\$80.95
SMTC-x61	.620" blade	Pad cleaning	80.95
SMTC-x62	.870" blade	Pad cleaning	80.95
SMTC-x110	1.550" dual* blade	Pad cleaning	135.00
SMTC-x96	Chip removal	0402, 0603 Chips	35.50
SMTC-x01	Chip removal	0805 Chips	35.50
SMTC-x02	Chip removal	1206, 1210 Chips	35.50
SMTC-x03	Chip removal	1808, 1812 Chips	35.50
SMTC-x05	SMD removal	SOT-23	35.50
SMTC-x06	Tunnel cartridge	SOIC-14, 16	40.50
SMTC-x08	SMD removal	SOT-89	35.50
SMTC-x09	Tunnel cartridge	SOIC-24	40.50
SMTC-x10	Tunnel cartridge	SOIC-20	40.50
SMTC-x42	Tunnel cartridge	SOIC-32	40.50
SMTC-x26	Tunnel cartridge	SOJ-28, SOM-36	40.50
SMTC-x140	Tunnel cartridge	SOJ-32, SOJ-34	40.50
SMTC-x148	Tunnel cartridge	SOJ-42	89.50
SMTC-x95	Tunnel cartridge	TSOP-28	40.50
SMTC-x154	Tunnel cartridge	TSOP-40	89.50
SMTC-x12	Quad cartridge	PLCC-20	63.50
SMTC-x103	Quad cartridge	PLCC-28	63.50
SMTC-x16	Quad cartridge	PLCC-32	63.50
SMTC-x14	Quad cartridge	PLCC-44	63.50
SMTC-118	Dual quad	PLCC-68 (700°F)	94.50
SMTC-x29	Dual quad*	PLCC-84	135.00
SMTC-x15	Quad cartridge	QFP-64, -80	94.50
SMTC-x86	Quad cartridge	QFP-132	94.50
SMTC-x118	Quad cartridge	PLCC-44 socket	63.50
SMTC-x145	Quad cartridge	PLCC-84 socket	135.00
TATC-501	Talon cartridge	0.015" tip	100.00
TATC-601	Talon cartridge	0.015" tip	100.00
TATC-502	Talon cartridge	0.25" x 0.39" tip	100.00
TATC-602	Talon cartridge	0.25" x 0.39" tip	100.00
TATC-503	Talon cartridge	0.62" x 0.33" tip	100.00
TATC-603	Talon cartridge	600 Series	100.00
TATC-504	Talon cartridge	500 Series	100.00
TATC-604	Talon cartridge	600 Series	100.00

\*Requires 2 handpieces.  
NOTE: x=5 for 500 Series, 0 for 600 Series, 1 for 700 Series.



## PLATO solder pots with precise temperature control

The PLATO® SP-101 and SP-301 are general purpose solder pots that control temperatures to  $\pm 11^\circ\text{F}$  ( $\pm 6^\circ\text{C}$ ) and have a 2.0 lb (1 Kg) capacity. They have a 3-index-position control switch with an infinitely variable temperature control.

The SP-500T and the SP-600T are precision pots with control temperature to  $\pm 5^\circ\text{F}$  ( $\pm 2.75^\circ\text{C}$ ) and exceed MIL-STD-2000 (J-STD-0018).

They have a new solid-state controller that limits

transient-voltage spiking to 2 mV peak-to-peak or less for voltage-sensitive components. The capacity on the SP-500T is 2.0 lb (1 kg) and the capacity on the SP600-T is 32 lb (14 kg).

All the solder pots have a safety heat shield, removable dross tray for easy cleaning, and metal construction for ESD protection.

### General-Purpose Pots



SP-101

SP-301

### Precision Pots



SP-500T

SP-600T

P/N	Description	Each
SP-101	General-purpose solder pot, 350 W, 300 °F–875 °F (525 °C)	\$246.10
SP-301	General-purpose solder pot, 500 W, 300 °F–1100 °F (595 °C)	254.45
SP-500T	Precision solder pot, 120 V, 360 W, ambient to 925 °F (496 °C)	846.70
SP-600T	Large precision solder pot, 120 V, 1,000 W, ambient to 900 °F (482 °C)	1709.45

## ESICO-TRITON Solder Pots

ESICO-TRITON solder pots are available in the following 3 styles:

(1) Standard models—model numbers without a suffix. (2) Models numbers with the suffix C—these models feature a thermocapes which adds approximately 150 °F to the temperature of the standard model without increasing the wattage of the heating element. (3) Model numbers with the suffix T—these models feature an adjustable thermostat for selecting an optimum operating temperature. The

EC-6 (to  $\pm 10^\circ\text{F}$ ) handles any 120 V AC heater load to 840 W (controls are fused and have a pilot light to indicate cycling). The EC-6 cannot be used with model suffix "T" pots and 20 pot.



P1200

P3600

P2000

P/N	Model	Watts	ID	Inside Depth (°F)	Temp Max.	SolderCapacity (lb)	Each
P1200	12	200	1-9/16"	1-1/2"	750	3/4	\$86.00
P12003	12C	200	1-9/16"	1-1/2"	900	3/4	101.50
P120020	12T	250	1-9/16"	1-1/2"	650	3/4	156.60
P2000	20	250	2"	1-1/2"	1,200	1-1/4	220.00
P3600	36	250	2-1/2"	1-3/4"	750	2-1/4	88.95
P36003	36C	250	2-1/2"	1-3/4"	900	2-1/4	106.35
P360020	36T	250	2-1/2"	1-3/4"	625	2-1/4	158.55
P3700	37	650	3-1/2"	1-3/4"	800	5	116.00
P37003	37C	650	3-1/2"	1-3/4"	1,000	5	141.15
P370020	37T	650	3-1/2"	1-3/4"	650	5	195.25
P7000	70	650	4-3/4"	1-3/4"	750	9	121.80
P700020	70T	650	4-3/4"	1-3/4"	650	9	199.15
P710020	71T	1,000	3-1/8"	4-1/4"	900	9-1/2	244.00
P7500	75	650	4-3/4" x 4-3/4"	1-3/4"	750	11-3/4	133.35
P750020	75T	650	4-3/4" x 4-3/4"	1-3/4"	650	11-3/4	205.00
P800020	80T	1,200	6" x 12"	1-7/8"	650	33	526.00
S5360	EC-6 wattage controller						66.00

## WELLER PRINCESS Heat Gun

Highly efficient and comfortable to use, this is the lightest industrial heat gun available. Use this versatile tool for any application including: encapsulation; re-flow soldering; epoxy curing; cooling and drying components; softening adhesives; and applying heat-shrink tubing and caps.

- Three-way switch (cool/off/heat) conveniently located at the trigger position
- Dual heat-settings for broad application
- Long-life heater and fan components
- Temperature: 800 °F
- Power: 120 V AC, 60 Hz, 3-wire grounded
- Net Wt: 13 oz
- UL Listed



6956 6957 6958 6964

P/N	Description	1-11	12+
6966C	Heat gun and 4 baffle/reflector adapters	\$123.75	\$109.70
6956	1/2" reflector	2.20	2.00
6957	1-1/2" reflector	2.30	2.10
6958	Reducing baffle	4.05	3.65
6964	Precision reflector	2.30	2.10

## IDEAL Heat Guns

- Super-quiet induction motor
- Designed for easy nozzle replacement
- Unique cool-nozzle design prevents serious burns from accidental contact
- Deflectors and adapters available for heat concentration and solder-sleeve applications



46-021

46-113

46-013

P/N	Description	Each
46-013	Heat gun	\$105.80
46-113	ESD heat gun	133.40
46-021	High-velocity heat gun	150.10
46-922	Gold nozzle, 800 °F–1,000 °F, for 46-013 and 46-113	16.70



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## MASTER APPLIANCE MASTER MITE™ Heat Gun

Compact, light and rugged, this heat gun is designed for electronic and electrical bench-work including: shrink-tube melting; solder performs; activating and curing adhesives and epoxies; pre-heating flux; etc.

- High-impact GENORYL housing withstands hard knocks
- Slip-on heat-shrink attachment and 650 °F element



10008

P/N	Description	Each
10008	Heat gun, 120V, 480W	\$71.10
20013	Replacement element, 650 °F (343 °C), 475 W, silver	20.35
40061	Pinpoint attachment, 1/4", concentration of heat exactly where you want it	11.60

## MASTER PROHEAT® VARITEMP® Heat Gun

This variable-temperature heat gun is for applying heat-shrinkable tubing and other specialized heat-activated connectors and terminals, plus heat-shrinkable insulated solder preforms and heat-shrinkable environmental crimp splices and terminals. A steady flow of hot air (from ambient to 900 °F) is provided.

- Optional attachment available
- Compact, lightweight, easy to use
- Variable temperature



PH1200

P/N	Description	Each
PH1200	Heat gun	\$135.25
PH1200-1	Complete with heat gun, bench stand, reducer, and attachments	158.80

## MASTER APPLIANCE VARITEMP® Heat Gun

With this heat gun you can dial in any temperature from ambient to 1,000 °F (538 °C) and lock it in to prevent variation during operation. The VARITEMP is ideal for applications such as heating thermoset resins or potting compounds or in the laboratory where exact and constant temperatures are required.

- Nonslip, adjustable stand (up to 90° rotation)
- Oil-resistant, grounded neoprene 3-wire cord-set
- Off/cool/hot switch—eliminates residual heat
- Double-protected element housing
- Contoured handle
- Made in USA



VT-750C

P/N	Description	Each
VT-750C	VARITEMP heat gun, 120 V, 1,740 W	\$142.45

## STEINEL Hot-Air Guns and Nozzles



07461

07062

07051

07061

HL2002LE



HG3002LCD

HL1802E

HL1502S

The HG3002LCD features continuously adjustable, electronically- and LCD-monitored hot air. Light-emitting diodes display the selected temperature, permitting exact work with monitored hot air. The heat range is 120 °F (50 °C) to 1,100 °F (650 °C). The HL2002LE has the same features as the HG3002LCD except for continuously variable air-flow. The HL1802E has the same features as the HG3002LCD except for continuously variable air-flow and the LCD temperature display.

The HL1502S has three preset temperatures: 120°F (50°C), 800°F (400°C) and 1050°F (550°C). This gun cannot be used with the 07461, 07062 and 07061 nozzles.

- Lightweight • Well balanced • Distinctive body style • Durable, long-lasting • UL Listed

P/N	Description	Each
HG3002LCD	Electronic hot-air gun with LCD readout	\$178.95
HL2002LE	Electronic hot-air gun with LED readout	159.95
HL1802E	Electronic hot-air gun	149.95
HL1502S	3-speed hot-air gun	86.95

## Nozzles for Hot-Air Guns

The 07051 is a 1-1/4" reflector nozzle that reflects heat around a surface. The 07061 is a 3/8" reflector nozzle for smaller shrink tubing and solder sleeve applications. The 07461 is a 5/8" reflector nozzle with closed side to deliver quick heat efficiently. The 07062 is a 3/8" reduction nozzle to pin point air flow.

P/N	Description	Each
07051	1-1/4" reflector nozzle for shrink tubing	\$9.95
07061	3/8" reflector nozzle for small solder sleeve	11.95
07062	3/8" reduction nozzle	9.95
07461	5/8" reflector nozzle for solder sleeve	11.25

NOTE: 07461, 07062, 07061 cannot be used w/HL1502S gun. All nozzles are made of stainless steel and for use with Steinel hot-air guns only.

## MASTER APPLIANCE MASTER HEAT GUN®s

These heavy-duty, industrial-quality heat guns go up to a temperature rating of 1,000 °F (538 °C) and a power rating of 1,740 W (120 V). The air-flow rating is 23 cfm at 3,000 fpm.

The universal motor, die-cast aluminum housing, reinforced mica-insulated ceramic heating element, and externally replaceable carbon brushes make the MASTER HEAT GUNS rugged and reliable sources of flameless heat—whether you're working with freezer coils, plastic laminates, circuit boards, PVC, fiberglass, or heat-shrink materials.



HG-201A

P/N	Description	Each
HG-201A	Heat Gun, 200 °F–300 °F, 120 V, 600 W	\$99.45
HG-301A	Heat Gun, 300 °F–500 °F, 120 V, 1,440 W	99.45
HG-501A	Heat Gun, 500 °F–750 °F, 120 V, 1,680 W	99.45
HG-751B	Heat Gun, 750 °F–1,000 °F, 120 V, 1,740 W	99.45

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We provide reduced pricing on large-quantity orders.



### 3M™ FP-301 Heat-Shrink Tubing and Heat-Shrink Tubing Kits

FP-301 tubing offers an outstanding balance of electrical, physical, and chemical properties for a wide variety of industrial and military applications. Rated for 135 °C continuous operation, all FP-301 tubing is split resistant, mechanically tough, easily marked, and cold-flow resistant. It comes in 4' lengths.

FP-301 tubing meets MIL-DTL-23053/5 Class 1 and 2, AMS-3636, and AMS-3637 requirements. It is UL Recognized (UL File Nos. E-39100 and E-69751), and CSA Certified at 600 V @ 125 °C (CSA No. 38227).

#### Shrink Ratio

FP-301 polyolefin tubing has a 2:1 shrink ratio. When fully recovered, the tubing shrinks to 50% of its as-supplied internal diameter.

#### FP-301 Kits

Each kit contains a versatile assortment of flexible-polyolefin heat-shrink tubing. The kits are available in 2 types: assorted colors or black only.



FP-301-Kit-Blk

FP-301-Kit-Asstd

Each kit box is 7" x 11" x 2-1/2" and is made of rugged translucent plastic with product and installation information on the cover.

The assorted-colors kit has a total of 133 pieces in 6" lengths and includes clear plus 6 colors: black, red, white, yellow, blue, and green. The contents of the assorted-colors kit, by expanded diameter, are listed in the chart below.

The "black" kit contains 102 pieces, all in 6" lengths. The contents of the "black" kit, by expanded diameter, are listed in the chart below.



Assorted-Colors Kit		"Black" Kit	
Size	Pieces	Size	Pieces
3/32"	35	3/16"	30
1/8"	28	1/4"	28
3/16"	21	3/8"	20
1/4"	21	1/2"	14
3/8"	14	3/4"	6
1/2"	14	1"	4

P/N	Recovered ID	Pieces/Box	Per Box 1-4	Per Box 5+
FP-301-3/64-Blk	.023"	25	\$14.55	\$12.90
FP-301-1/16-Blk	.031"	25	14.85	13.15
FP-301-3/32-Blk	.046"	25	16.85	14.95
FP-301-1/8-Blk	.062"	25	17.80	15.80
FP-301-3/16-Blk	.093"	25	21.60	19.20
FP-301-1/4-Blk	.125"	12	13.65	12.15
FP-301-3/8-Blk	.187"	12	15.20	13.50
FP-301-1/2-Blk	.250"	12	16.45	14.60
FP-301-3/4-Blk	.375"	12	22.10	19.65
FP-301-1-Blk	.500"	15	12.90	11.45
FP-301-Kit-Asstd	—	—	45.50	42.00
FP-301-Kit-Blk	—	—	45.50	42.00

We're Here to Help You with Your Questions.

### APS GOLD WAVE Soldering System

This system is for removal and replacement of through-hole components and connectors mounted on PC boards, as well as selective soldering applications. The microprocessor-based digital controller precisely and automatically regulates the following process parameters: solder-bath temperature to  $\pm 5$  °F, solder-wave flow height, solder-flow cycle time, and excess solder "blow-off" cycle time. "Blow-off" air unit removes solder remaining in through holes after reflow. Overhead locator laser light pinpoints the position for placing component over wave.

Includes: • Storage for 25 menus • Membrane keypad



GW-10



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*We provide telephone technical assistance with your purchases.*



*We provide world-class quality ISO-9002-certified services and facilities.*

P/N	Description	Each
GW-10	GOLD WAVE soldering system	\$3295.00
GW10-1420	14-20-pin DIP nozzle	200.00
GW10-2428	24-28-pin DIP nozzle	200.00
GW10-3048	30-48-pin DIP nozzle	200.00
GW10-PGA1	1" x 1" PGA nozzle	200.00
GW10-PGA150	1-1/2" x 1-1/2" PGA nozzle	200.00
GW10-PGA200	2" x 2" PGA nozzle	200.00
GW10-FC275	2-3/4" x .35" flat connector nozzle	200.00
GW10-LC400	4" x 3/4" large connector nozzle	200.00



# From the bench

## DESOLDERING

Courtesy of Edsyn, Inc.

Desoldering is a term that most production supervisors hate to hear. It brings on visions of board damage, expense, and headaches. In this world of TQM, SPC, and ISO, rework is something we all would like to avoid. However unpleasant it seems, desoldering is a fact of the electronic assembler's life.

## MAIN COMPONENTS OF SUCCESSFUL DESOLDERING

### Proper Heat Transfer

This is of key importance. For the desoldering pro-

cedure to be successful, a tool must transfer the correct amount of heat through the ground and power planes to allow the joint to be fully reflowed in a reasonable amount of time. A tool that provides feedback helps the user to determine if the proper amount of heat is being applied.

### Good Vacuum

Simply put, you need a good vacuum supply to remove the molten solder.

### Proper Tip Selection

The tip needs to fit the job. The outside diameter of the tip needs to be the same size or slightly smaller than the outside diameter of the pad or land on the printed-circuit board. The hole diameter of the tip needs to be as large as possible given the size of the lead. When these requirements are met, the opti-

mum extraction of molten solder can take place.

### Good Technique

- Keep the temperature as low as possible, use only enough to get the job done. This promotes longer tip life and reduces the possibility of damage to the circuit board.
- Do not apply too much pressure to the circuit board. Excess pressure does not increase the transfer of heat.
- Use a slightly circular moving motion to center the component lead in the through-hole during the desoldering procedure. This makes the removal of the molten solder easier.
- After the solder is removed and before removing the component from the circuit board, use a tool to disengage any lead that is adhering to the wall of the through-hole.

## EDSYN Desoldering Stations

The ZD500DX is a self-contained, cost-effective, deluxe hot-tip station which allows for fast and clean desoldering. Accurate temperature and power control are achieved with the new closed-loop temperature-controlled circuit board while a new external calibration feature helps with ISO 9000 compliance.

- Meets all MIL-SPECS • Temperature-controlled
- Excellent for multi-layer boards • Easy maintenance • Temperature range: 400°–800 °F • ESD-safe • UL Listed



ZD500DX

P/N	Description	1-5	6+
ZD500DX	Self-contained desoldering station	\$749.95	\$712.45
ZD505V	Same as above only requires external air source	604.95	574.70
ZD905V	Soldering/desoldering station, requires external air source	706.80	671.45

## WELLER Soldering/Desoldering Station

The DS200 is a tough soldering/desoldering station ideal for limited-space work areas. It features footswitch-operated shop-air for fast response and a desoldering iron with a high-mass head and threaded tiplests for quick recovery from thermal loads.

- Electronically controlled • DS1204A high-mass 54 W desoldering pencil-style iron • EC1201A 40 W soldering iron with ETA tip (can also be used with the EC1503A 42 W or EC1302A 20 W iron)
- Shop-air operated for maximum vacuum
- Dual-control in single EC housing provides a smaller footprint • Base unit is the DEC1001 control unit • ESD-safe • UL Listed



DS200

P/N	Description	1-5	6+
DS200	Soldering/desoldering station complete with EC1201A 40-W iron and stand; DS1204A 54-W desoldering iron with foot-switch and stand	\$715.40	\$634.30
DS200K	Desoldering kit with DS1204A desoldering iron, foot-switch and stand (for use with current WELLER EC, WTL and DEC stations)	415.65	368.50

## WELLER Self-Contained Desoldering Gun

The WELLER SCD100 desoldering gun features a self-contained vacuum pump that draws solder into its unique collector tube. The unit comes complete with a triplet clean-out tool and 2 additional disposable collector tubes.

- Lightweight for easy handling • Portable desoldering • Disposable solder collector
- Low-noise pump • Includes triplet clean-out tool • Heats up to over 800 °F • Lighted power switch • 6' cord



SCD100

P/N	Description	Each
SCD100	Self-contained desoldering gun, 120 V	\$199.50
SCD112	Triplet, desoldering, 0.9 mm	16.40
SCD113	Triplet, desoldering, 1.2 mm	16.40
SCD114	Triplet, desoldering, 1.8 mm	16.40

See our desoldering tip selection on page 71.



## METCAL SP440 Self-Contained Desoldering System

This system is designed for production-level through-hole rework applications. With 50 W of power and tips specially designed to maximize heat transfer, the SP440 is ideal for heavy load desoldering of components on heavy ground-plane and multilayered PCBs. The SP440 delivers superior METCAL performance at a price that is competitive with lesser tools.

Using METCAL's patented SMARTHEAT technology, the SP440 delivers higher watt density power at lower temperatures than conventional desoldering tools—with no overshoot. This minimizes the risk of thermal damage.

The whisper-quiet, self-contained vacuum pump delivers a powerful vacuum capable of clearing through-holes quickly and completely. Because the vacuum system is built into the unit, the SP440 is portable and ideal for areas lacking shop air.

The lightweight, ergonomic, pencil-grip desoldering tool is designed to maximize operator control and comfort while reducing fatigue. The cable and vacuum tubing are burn-proof and the solder-collection chamber is designed for easy cleaning—no glass tubes.

The system includes a 50-W power supply, self-contained vacuum, desoldering tool, and work stand—plus an automatic time-out feature to extend tip life. A variety of desoldering tips are available—sold separately.

- Self-contained vacuum
- 50 W of power • Quiet vacuum pump • Ergonomic pencil-grip desoldering tool • Automatic time-out for longer tip life



SP440

P/N	Description	Each
SP440-11	Self-contained desoldering system	\$650.00

## WELLER 4624 & 4024 Series Soldering/Desoldering Station

- Meets all MIL-SPECS • Self-contained air source
- Soldering temp. range: 550 °F–850 °F • Desoldering temperature range: 500 °F–1,000 °F • Use with any 99 Series iron to suit a variety of applications
- Self-contained air source needs no external air
- New lightweight pistol-style desoldering tool (5098AS) or inline style (5088AS)
- ESD safe
- UL Listed



P/N	Description	1-3	4+
4624IL	Self-contained solder/desolder station with 9931AS iron and 5088AS pencil-style desoldering iron	\$783.85	\$695.10
4624P	Same as above only with 5098AS high-performance pistol-style desoldering iron	783.85	695.10
4024IL	Pencil-style desoldering (5088AS) station; self-contained	599.65	531.75
4024P	Pistol-style (5098AS) desoldering station; self-contained	599.65	531.75

## DEN-ON Desoldering Gun

- Tip temperature adjustable from 575 °F–850 °F
- Portable self-contained vacuum desoldering gun
- Meets DOD-STD-2000-1B • Temperature-controlled, 480 °F–780 °F
- Easy to clean and operate • ESD-safe
- UL Listed

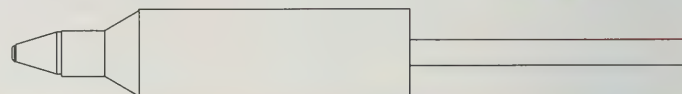


SC-7000-Lesstip

P/N	Description	Each
SC-7000-Lesstip	120-V desoldering gun; includes: 3 sets of filters, 2 cleaning pins and 1 tip wrench	\$555.00
08-00-00	Stand with sponge	25.00
50-01-11	.8-mm tip	37.00
50-01-12	.8-mm tip, slim	37.00
50-01-13	.8-mm tip, ultra slim	37.00
50-01-14	1-mm tip	37.00
50-01-15	1.5-mm tip	37.00
50-01-16	1-mm tip, slim	37.00
50-01-17	1.5-mm tip, slim	37.00
51-57-00	Hot-air nozzle	37.00

## SDC desoldering cartridges

These highly durable cartridges are designed for high-heat transfer, making desoldering on multilayered boards much easier. The cartridges are available in 2 temperature ranges (600 Series and 700 Series). A typical board requires a 700 Series tip. For thermally sensitive components or small single-sided boards, start with a 600 Series tip.



P/N 600 Series	P/N 700 Series	ID (A)	OD (B)	Each
SDC-602	SDC-702	0.025"	0.055"	\$29.95
SDC-603	SDC-703	0.030"	0.060"	29.95
SDC-604	SDC-704	0.040"	0.070"	29.95
SDC-605	SDC-705	0.050"	0.080"	29.95
SDC-606	SDC-706	0.060"	0.090"	29.95
SDC-607	SDC-707	0.095"	0.125"	29.95

# METCAL

An OK International Brand

## METCAL MX-500DS Soldering/SMT Rework/Desoldering System



MX-500DS

This system allows you to do both SMT and through-hole rework with 1 power supply at the bench. The station converts shop air into a powerful venturi vacuum. The MX-500-DS-11 uses paper solder-collection liners instead of glass tubes for easy maintenance.

MX-500DS includes: • 2-port switchable power supply with power cord • Desoldering handpiece • Desoldering cord • ESD air hose with fitting • 2 work stands • Hand-piece with cord • Work stand • 2 sponges • 2 cartridge-removal pads • Cleaning brush • Tube-cleaning brush • Chamber liner and filter pack • Desoldering-tip cleaner

P/N	Description	Each
MX-500DS-11	Soldering/SMT rework/desoldering system	\$1025.00



## Weller tiptlets

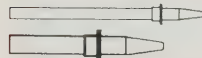


For DS200 soldering, desoldering stations on page 69

- For use with DS1204A desoldering iron • Plated parts for contacting solder • All tiptlets have stainless-steel liner brazed to tiptlet for better heat transfer.
- Entire tiptlet is iron, nickel, and chrome plated, then tinned • Chrome plating eliminates the need for applying antiseizing compound on threads

P/N	ID	OD	1-49	50-99	100+
DS110	.062"	.024"	\$12.45	\$11.05	\$10.35
DS111	.093"	.024"	12.45	11.05	10.35
DS112	.078"	.031"	12.45	11.05	10.35
DS113	.093"	.046"	12.45	11.05	10.35
DS114	.125"	.073"	12.45	11.05	10.35
DS115	.062"	.024"	12.45	11.05	10.35
DS116	.093"	.043"	12.45	11.05	10.35
DS117	.093"	.024"	12.45	11.05	10.35

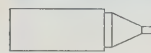
## Weller desoldering tips



4071 and 4062 tips shown

The following tips fit the 4088AS pencil-style desoldering iron:

P/N	Length	ID	OD	1-49	50-99	100+
4061	1"	.020"	.060"	\$3.65	\$3.50	\$3.25
4062	1"	.040"	.080"	3.65	3.50	3.25
4071	2"	.030"	.060"	4.60	4.40	4.15
4072	2"	.040"	.080"	4.60	4.40	4.15

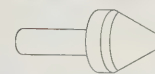


4005 tip shown

The following tips fit the 5088AS and 5098AS desoldering tools

P/N	ID	OD	1-49	50-99	100+
4005	.032"	.060"	\$14.95	\$14.15	\$13.25
4006	.040"	.080"	14.95	14.15	13.25
5038	Adapter for SMD tips		12.35	11.05	10.50

## EDSYN desoldering tips



For the ZD500 (DX), ZD505V, ZD905V and the ZD906

Heavy-Duty tip shown

P/N	Description	ID	Length	1-49	50-99	100+
ZD12	Heavy-Duty	.03"	.5"	\$11.35	\$10.00	\$9.50
ZD13	Heavy-Duty	.04"	.5"	11.35	10.00	9.50
ZD14	Heavy-Duty	.06"	.5"	11.35	10.00	9.50
ZD18	Heavy-Duty	.31"	.5"	11.35	10.00	9.50
ZD19	Heavy-Duty	.12"	.5"	11.35	10.00	9.50
ZD107	Funnel	.02"	.48"	13.65	13.00	12.25
ZD112	Funnel	.03"	.48"	13.65	13.00	12.25
ZD113	Funnel	.04"	.48"	13.65	13.00	12.25
ZD111	Funnel	.03"	1.22"	20.80	19.75	18.70

Note: Other sizes available.

## PLATO desoldering tips

**PACE**—For the PACE SX-70, and SK-65A desoldering irons.

PLATO Premium Grade P/N	PACE Premium Grade P/N	PACE Economy Grade P/N	Hole Diam.	Tip Width	1-49	50-99	100+
30-030	1121-0462	1121-0367	.030"	.065"	\$7.10	\$6.75	\$6.60
30-040	1121-0463	1121-0342	.040"	.085"	7.10	6.75	6.60
30-050			.050"	.095"	7.10	6.75	6.60
30-060	1121-0464	1121-0368	.060"	.115"	7.10	6.75	6.60

**PACE, AIR-VAC® and A.P.E.®**—For the PACE, AIR-VAC and A.P.E. desoldering irons: SX-20, SX-25, SX-25V, SX-30, SX-30V SOLDX-X-TRACTORS™. Sold in packages of 10.

PLATO P/N	PACE P/N	Hole Diam.	Tip Width	1-49	50-99	100+
20-0109	1121-0213	.025"	.060"	<del>\$16.35</del>	<del>\$10.70</del>	\$6.30
20-0114	1121-0480	.030"	.060"	<del>16.35</del>	<del>10.70</del>	6.30
20-0110	1121-0479	.040"	.080"	<del>16.35</del>	<del>10.70</del>	6.30
20-0113	1121-0216	.050"	.090"	<del>16.35</del>	<del>10.70</del>	6.30
20-0111	1121-0217	.060"	.100"	<del>16.35</del>	<del>10.70</del>	6.30
20-0112	1121-0091	.090"	.125"	<del>16.35</del>	<del>10.70</del>	6.30

Pace is a registered trademark of Pace, Inc.

**PACE**—For the PACE® SX-40A, SX-55A, SX-65A, and SX-70 SODR-X-TRACTORS® with PLATO adapter 33-0001. Sold in packages of 10.

PLATO P/N	PACE P/N	Length	Hole Dia.	Tip Dia.	1-49	50-99	100+
20-025	1121-0485	1.75"	.030"	.080"	<del>\$14.45</del>	<del>\$12.75</del>	\$10.50
20-040	1121-0486	1.75"	.040"	.080"	<del>14.45</del>	<del>12.75</del>	10.50
20-050	—	1.75"	.050"	.090"	<del>14.45</del>	<del>12.75</del>	10.50
20-060	1121-0255	1.75"	.060"	.100"	<del>14.45</del>	<del>12.75</del>	10.50
33-0001	1360-0083	Adapter for all 1/8" diameter tips			4.80	4.40	4.25

**HAKKO**—For the HAKKO desoldering irons: 470, 471, and 472 with the 802, 807, and 808 handpieces.

PLATO P/N	HAKKO P/N	Hole Diam.	Tip Width	1-49	50-99	100+
HK-0880	A-1004	.030"	.090"	\$12.35	\$10.40	\$8.95
HK-0881	A-1005	.040"	.100"	12.35	10.40	8.95
HK-0882	A-1006	.050"	.120"	12.35	10.40	8.95
HK-0883	A-1007	.060"	.120"	12.35	10.40	8.95

**HAKKO and OK INDUSTRIES**—For the HAKKO 483, 700, 707, 800, and 800L; and OK INDUSTRIES SA-150/250/350/450, DC20/40/60 desoldering irons.

PLATO P/N	OK P/N	HAKKO P/N	Hole Diam.	Tip Width	1-49	50-99	100+
HK-0008	SAT-4V-031	483-T-0.8 800-T-0.8	.030"	.090"	\$15.75	\$13.80	\$12.30
HK-0010	SAT-4V-039	483-T-1.0 800-T-1.0	.040"	.090"	15.75	13.80	12.30
HK-0013	SAT-4V-051	483-T-1.3 800-T-1.3	.050"	.100"	15.75	13.80	12.30
HK-0016	SAT-4V-063	483-T-1.6 800-T-1.6	.060"	.120"	15.75	13.80	12.30

Hakko is a registered trademark of Hakko Metal Industries, LTD

## EDSYN desoldering pumps

- Hand-operated desoldering pumps for manual desoldering
- Push-button trigger • Self-cleaning nonburn tip



P/N	Description	1-9	10+
DS017	Deluxe SOLDAPULLT®	\$18.30	\$12.80
DS017LS	ESD-safe deluxe SOLDAPULLT	20.60	14.35
AS196	Chrome-plated ESD-safe SOLDAPULLT	26.05	25.00
PT109	Smaller diameter than DS017	13.35	12.00
PT409	Same as PT109 only features ESD-safe construction	17.90	15.75
SS350	Low-static standard metric SOLDAPULLT (not shown)	8.80	8.35
SRT12	Standard replacement tip for DS017 and PT109	2.95	2.75
LS197	Low-static replacement tip for AS196, DS017LS, and PT409	4.95	4.55



Trouble finding what you need?

Help is at your fingertips. Just call us toll free, 24 hours a day, 7 days a week.



## SODER-WICK® Desoldering Braid



## SODER-WICK Rosin

• Noncorrosive Type R rosin flux • Minimizes risk of heat damage to the board • Won't leave ionic contamination on the board • Meets MIL-F-14256 E & F

Size	P/N	1-24	25+	P/N	1-24	25+
	5' Length			10' Length		
1	50-1-5	\$2.10	\$1.85	50-1-10	\$3.80	\$3.35
2	50-2-5	2.10	1.85	50-2-10	3.80	3.35
3	50-3-5	2.15	1.95	50-3-10	3.90	3.45
4	50-4-5	2.45	2.20	50-4-10	4.45	3.90
5	50-5-5	2.70	2.45	50-5-10	4.90	4.30
6	50-6-5	3.00	2.65	N/A	—	—

NOTE: Also available in 50' and 500' lengths.

## SODER-WICK Rosin SD

• All the features of SODER-WICK rosin • Packaged in ESD-safe, static-dissipative bobbins • Minimizes the risk of damage from static electricity

Size	P/N	1-24	25+	P/N	1-24	25+
	5' Length			10' Length		
1	80-1-5	\$2.25	\$2.00	80-1-10	\$4.00	\$3.50
2	80-2-5	2.25	2.00	80-2-10	4.00	3.50
3	80-3-5	2.45	2.20	80-3-10	4.25	3.75
4	80-4-5	2.60	2.35	80-4-10	4.70	4.15
5	80-5-5	2.90	2.60	80-5-10	5.25	4.60
6	80-6-5	3.10	2.75	N/A	—	—

## SODER-WICK No-Clean SD

• Patented noncorrosive, halide-free, organic, no-clean flux • Packaged in ESD-safe, static-dissipative bobbins

Size	P/N	1-24	25+	P/N	1-24	25+
	5' Length			10' Length		
1	60-1-5	\$2.45	\$2.20	60-1-10	\$3.45	\$3.05
2	60-2-5	2.45	2.20	60-2-10	4.45	3.90
3	60-3-5	2.50	2.25	60-3-10	4.70	4.15
4	60-4-5	2.90	2.60	60-4-10	5.25	4.60
5	60-5-5	3.20	2.85	60-5-10	5.80	5.10
6	60-6-5	3.45	3.10	N/A	—	—

## SODER-WICK Unfluxed

• Can be coated with any flux type • Allows for use of the same flux type throughout the production process • Provides quick and safe desoldering

Size	P/N	1-24	25+	P/N	1-24	25+
	5' Length			10' Length		
1	70-1-5	\$2.00	\$1.80	70-1-10	\$3.55	\$3.10
2	70-2-5	2.00	1.80	70-2-10	3.55	3.10
3	70-3-5	2.15	1.95	70-3-10	3.70	3.25
4	70-4-5	2.35	2.10	70-4-10	4.20	3.70
5	70-5-5	2.50	2.25	70-5-10	4.60	4.05
6	70-6-5	2.70	2.45	N/A	—	—

NOTE: Also available in 50' and 500' lengths.

## SODER-WICK BGA

The most effective, economical way to safely and completely remove solder from BGA pads and chips.

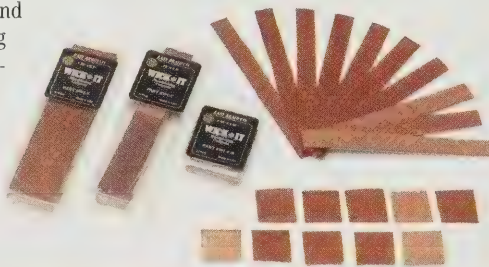
• Sized and designed specifically for BGA pad and chip rework and repair • Entire BGA pads cleaned in 3 to 4 passes • Packaged in ESD-safe static-dissipative bobbins

P/N	Description	1-24	25+
80-BGA-5	Soder-Wick BGA rosin, 5'	\$3.50	\$3.15
60-BGA-5	Soder-Wick BGA no-clean, 5'	3.90	3.50
75-BGA-5	Soder-Wick BGA unfluxed, 5'	3.25	2.85

## EASY BRAID WICK-IT™ Desoldering Coupons

The ultimate answer to removing excess solder on BGA, Flip Chip, and other multi-leaded device pads.

• Removes excess solder quickly and cleanly • Sized to fit most existing footprints • Leaves a residue which does not need to be cleaned • Works easily with both convection- and conduction-type heating rework tools • Manufactured under SPC guidelines • Packaged in 5.5" strips which may be cut to desired length, or in convenient coupon form



P/N	Standard Pack	Width	For Device Type	Each
WI-B	10	.50" x 5.5"	BGA-119	\$2.35
WI-C	10	.75" x 5.5" QFP-44; PLCC-28, 32	BGA-119	2.60
WI-C-S	10	.75" x .75"		.50
WI-D	10	1.00" x 5.5"	BGA-119, 132, 169, 169-6, 225, 225-6, 228, 255, 256, 303, 357, 361; QFP-48, 52, 64, 80, 100; BQFP-100; PLCC-44, 52	2.85
WI-D-S	10	1.00" x 1.00"		.60
WI-E	10	1.25" x 5.5"	BGA-256P, 272, 324 PLCC-68	3.70
WI-E-S	10	1.25" x 1.25"		.75
WI-F	10	1.50" x 1.50"	BGA-313, 352, 388, 625; QFP-120, 128, 144, 160, 208; BQFP-132, 164; PLCC-84, 100	1.00
WI-M	10	2 each: .50" x 5.5", .75" x 5.5", 1.25" x 5.5", 1.00" x 5.5" 4 each: 1.50" x 1.50"	See Above	16.85

## EASY BRAID CO.™ Desoldering Braid

• Extremely fast wicking action • More oxide-free strands of copper per square inch • Meets MIL-STD 2000 • Only pure Type R rosin flux is used, meets MIL-F-14256F Type R



P/N	Color	Width	Length	1-24	25-100	101+
<b>SEA BRAID™ Series Un-Fluxed</b>						
S-A-5	Silver	.025"	5'	\$1.60	\$1.45	\$1.30
S-B-5	Gold	.050"	5'	1.60	1.45	1.30
S-C-5	Green	.075"	5'	1.65	1.45	1.35
S-D-5	Blue	.100"	5'	1.80	1.65	1.50
S-E-5	Brown	.125"	5'	1.95	1.75	1.60
<b>ONE STEP™ Series RMA No-Clean Flux</b>						
OS-A-5	Silver	.025"	5'	1.90	1.60	1.50
OS-B-5	Gold	.050"	5'	1.90	1.60	1.50
OS-C-5	Green	.075"	5'	1.85	1.65	1.55
OS-D-5	Blue	.100"	5'	2.10	1.90	1.80
OS-E-5	Brown	.125"	5'	2.45	2.20	2.10
<b>ONE STEP2™ Low-Residue Synthetic No-Clean Flux</b>						
OS2-A-5	Silver	.025"	5'	1.90	1.70	1.60
OS2-B-5	Gold	.050"	5'	1.90	1.70	1.60
OS2-C-5	Green	.075"	5'	1.90	1.70	1.60
OS2-D-5	Blue	.100"	5'	2.30	2.10	1.90
OS2-E-5	Brown	.125"	5'	2.70	2.45	2.25
<b>QUICK BRAID™ Series Rosin Flux</b>						
Q-A-5	Silver	.025"	5'	1.60	1.45	1.30
Q-B-5	Gold	.050"	5'	1.60	1.45	1.30
Q-C-5	Green	.075"	5'	1.65	1.50	1.35
Q-D-5	Blue	.100"	5'	1.80	1.65	1.50
Q-E-5	Brown	.125"	5'	1.95	1.75	1.60



**APS GOLD-PRINT™ Manual Screen Printers**  
**SPR-20**

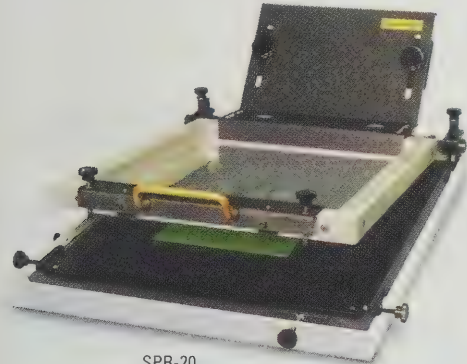
The SPR-20 bench-top, manual stencil/screen printer is designed for low-to-medium-volume assembly runs. Precise axis controls (X, Y, Z and theta) allow for accurate and consistent deposition of solder paste or masking material for SMT. This durable easy-to-use system provides repeatable and reliable results.

- Compact, rugged bench-top system for batch or prototype runs
- Fine X, Y, Z, adjustments for stencil-to-board alignment
- True center-point theta adjustment to enhance alignment
- Independent 4-point Z-axis leveling
- Max. print area: 12" x 15"
- Quick and easy stencil changeover for short set-up times
- Easy-lift spring-assisted print frame
- Compatible with tubular-framed or frame-less stencil/screens
- Complete printing kit provides polyurethane squeegee, holder, and 1 tubular frame

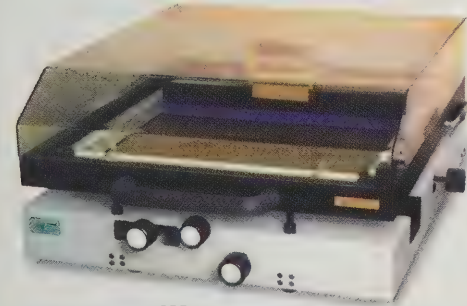
**SPR-30**

The SPR-30 has all the features of the SPR-20 plus the following:

- Maximum print area of 19" x 19"
- Squeegee guide control for precise print stroke
- Clear dust cover to reduce paste contamination
- Adjustable frame holder to handle any cast or tubular frame up to 20" x 20"




SPR-20




SPR-30

P/N	Description	Each
SPR-20	GOLD-PRINT manual screen printer	\$1995.00
SPR-30	GOLD-PRINT manual screen printer	✚ 4495.00

✚ Products with this symbol ship directly from the manufacturer.

 We provide telephone technical assistance with your purchases.

 We are a full-service distributor with a broad range of the best products.

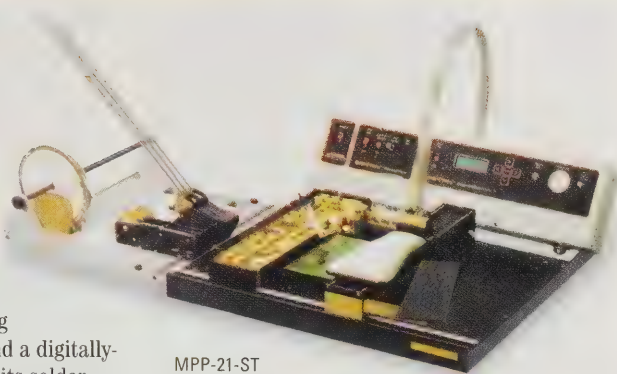
**APS GOLD-PLACE™ Manual Pick-and-Place Systems**

This is a single-arm pick-and-place and dispense system with a patented hand-rest and arm assembly that alleviates operator fatigue by supporting the operator's hand throughout the entire work process. It has a vacuum tip that automatically toggles on and off during component pick-up and placement, and a digitally-timed dispenser that accurately deposits solder paste, adhesives, and various potting compounds.

**MPP-10 Low-Cost Manual Pick-and-Place System**

- Easy change-over design allows for right- or left-hand operation (unlike any other system)
- Patented moveable (left to right) ESD-safe component trays enhance operator performance, regardless of

Features	MPP-21	MPP-20	MPP-11	MPP-10
Hand Rest and Moveable Arm Assembly	•	•	•	•
Designed for Right- or Left-Hand Operation	•	•	•	•
Moveable (left to right) ESD-Safe Component Trays	•	•	•	•
AUTO-PICK™ Feature	•	•	•	•
Digital Dispenser Control	•	•	•	•
Inline Design with Track Hook-Up	•	•	•	•
Work Area: 16" x 24"	•	•	•	•
Work Area: 14" x 14"	•	•	•	•
Removable Component Bins	•	•	•	•
Optional Stand	•	•	•	•



MPP-21-ST

- board size, by allowing trays to be next to placement area
- AUTO-PICK feature increases performance by allowing for automatic turning on and off of the vacuum during component pick-up and placement-especially good for placing MELFs
- Work area handles board sizes up to 14" x 14"
- Removable component bins

**MPP-20 Manual Pick-and-Place System**

The MPP-20 has all the features of the MPP-10 plus the following:

- Inline design with a track hook-up that provides multiple-station slide-line (pass-through) capabilities
- Large (16" x 24") work area
- Optional stand that enables the unit to be used as a stand-alone system

P/N	Description	Each
MPP-20	Manual pick-and-place system	✚ \$3995.00
MPP-21-ST	Manual pick-and-place system with dispenser and stand	✚ 5190.00
MPP-10	Low-cost manual pick-and-place system	✚ 2795.00
MPP-11	Low-cost manual pick-and-place system with dispenser	✚ 3595.00

✚ Products with this symbol ship directly from the manufacturer.

**APS GOLD-FLOW™ 12", Belted, Bench-Top, SMT Reflow Oven**

- Forced-air convection and IR oven with 12"-wide conveyor
- 36"-long bench-top oven with 24"-long heated tunnel
- Stainless-steel conveyor and chambers
- 3 vertical heating zones plus a cooling zone
- Easy-lift clam-shell design
- Computer controller with: 100-menu profile storage, 7-day programmable timer, built-in real-time temperature profiler, ISO 9000 SPC fault monitoring and reporting, viewing windows with lighted interior
- GF-12 includes 3 top heaters, 2 bottom heaters, and 1 cyclonic generator
- GF-12A includes 3 top heaters, 3 bottom heaters, 3 cyclonic generators, and conveyor extensions



GF-12

P/N	Description	Each
GF-12	GOLD-FLOW reflow oven	\$7995.00
GF-12A	GOLD-FLOW reflow oven	8995.00



## From the bench

### SURFACE-MOUNT TECHNOLOGY

Process control and repeatability each play an important role in low-volume production and prototype assembly of SMT boards. Use the following tips to insure their implementation. (1) A stencil printer or timed dispenser should be used to control the amount of solder paste that is deposited on a circuit board's individual pads. (2) When placing a component with a lead pitch of .025" or greater, a manual pick-and-place system\* should be used to insure accurate placement and reduce operator fatigue. (3) For reflow, convection-style heating is ideal since it affords maximum temperature uniformity and reduces the risk of thermal shock to valuable components. Single-component reflow or simple touch-up can be performed with a hot-air pencil or a focused convection tool. When simultaneous reflow is required, a conveyor oven is recommended.

\*400–500 components per hour is a realistic rate when using manually assisted systems.

### APS Batch Oven for Reflow or Curing

The GF-B's unique shuttle system enables greater throughput than conventional batch ovens. The oven uses 100% forced-air convection and can handle PCBs up to 12" x 12". This economical and easy-to-use batch oven incorporates full stainless-steel construction, a large viewing window on top, microprocessor controls, and dual cooling zones. Full nitrogen inerting is an option.

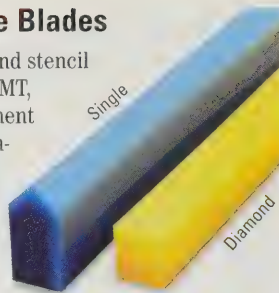


GF-B

P/N	Description	Each
GF-B	Batch reflow oven	\$4995.00
GF-B-N	Nitrogen inerting option	1000.00

### JNJ Squeegee Blades

- Ideal for screen and stencil printing
- Use for SMT, hybrids and component marking
- Precision-ground for superior performance
- Sizes range to fit any screen and stencil printer



#### Diamond (.375" x .375" x 24")

P/N	Description	Each
P60D, P70D, P80D, P90D	60, 70, 80, 90 durometer, diamond	\$16.00
P100D, P110D, P120D	100, 110, 120 durometer, diamond	27.50

#### Single Edge (.375" x .75" x 27")

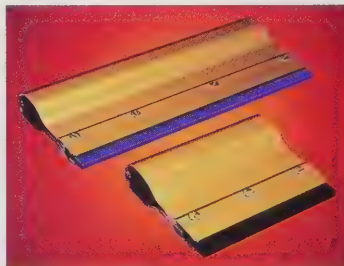
P/N	Description	Each
P60S, P70S, P80S, P90S	60, 70, 80, 90 durometer, single edge	\$28.50
P100S, P110S, P120S	100, 110, 120 durometer, single edge	38.50

### JNJ Universal Hand-Held Squeegee Holders



These rugged holders are made from gold-anodized extruded aluminum. They are capable of holding a 3/8" polyurethane blade or a SMARTEK™ adjustable-angle metal squeegee blade.

UH9012



UH9006

P/N	Description	Each
UH9006	6" holder	\$49.00
UH9012	12" holder	79.00
UH9018	18" holder	99.00

### JNJ Hand-Held Squeegee-Blade Cutter

Cut diamond and single-edge polyurethane squeegee blades cleanly and safely. This ergonomically designed tool is made from black anodized aluminum and comes with a precision steel blade and a set of 5 replacement blades. It cuts 50 to 100 durometer-hardness diamond blades, and 50 to 90 durometer-hardness single-edge blades.

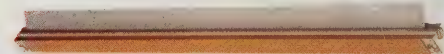


0320

P/N	Description	Each
0320	Hand-held squeegee-blade cutter	\$85.00
BLAD	Spare cutter blades, 5-pack	7.00

### JNJ Metal Squeegee Blades

JNJ offers a complete line of metal squeegee blades. The standard adjustable-angle metal squeegee blade inserts directly into any standard diamond or angle-edge squeegee-blade holder.



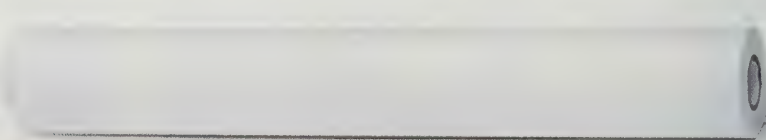
P/N	Description	Each
MSA8	8" metal squeegee assembly	\$330.00
MSA10	10" metal squeegee assembly	350.00
MSA12	12" metal squeegee assembly	350.00
MSA14	14" metal squeegee assembly	350.00
MSA16	16" metal squeegee assembly	350.00

NOTE: Above P/N numbers and prices are for a set of 2 blades.

### JNJ SMARTROLL™

This clean-room grade wiping roll is for cleaning under stencils in any automatic screen and stencil printers between prints. It removes residual solder paste with or without stencil cleaners.

- Absorbent, lint-free, durable



P/N	Description	Each
4101MP	SMARTROLL MPM printer: 18" (W) x 39' (L), 3/4" core (ID)	\$15.00
4102MP	SMARTROLL MPM printer: 18" (W) x 39' (L), 1" core (ID)	15.00
4201DK	SMARTROLL DEK 265 printer: 22" (W) x 39' (L), 3/4" core (ID)-paper core, with spare core, no cutback	22.00

NOTE: Sizes available for all screen printers



New Product: This symbol represents the industry's latest offerings.



We accept fax orders 24 hours a day, 7 days a week.



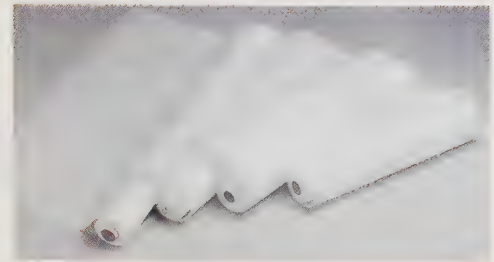
We provide telephone technical assistance with your purchases.



## CHEMTRONICS STENCILWORKS™ V and R

STENCILWORKS V is an under-stencil wiping roll for automatic printers with vacuum stencil-cleaning systems. STENCILWORKS R is an under-stencil wiping roll for automatic printers with regular or nonvacuum cleaning systems.

- Low lint • Strong and absorbent • STENCILWORKS V features semiopaque, lightweight material for effective vacuum pull • STENCILWORKS R features thicker material that resists tears • Custom roll sizes are available



### For Regular, Nonvacuum Systems

P/N	Replaces OEM Roll Number	Make	Machine	Size	Core Length	Core ID	Roll Length	Cutback	Each
SRMP01	P1485	MPM	AP and UP Series	01	18"	.75"	39'	.5", 1 end	\$17.55
SRMP02	P2348	MPM	AP Series	02	18"	1"	33'	.5", 1 end	17.55
SRMP03	P1858	MPM	AP Series	03	25.25"	.75"	39'	.5", 1 end	19.00
SRMP04	—	MPM	UP Series	04	24.5"	.75"	39'	.5", 1 end	19.00
SRDK01	112239	DEK	265 Series	01	21.25"	.75"	36'	None	28.85
SRDK02	129051	DEK	265GS Series	02	20.87"	.75"	30'	.25", 2 ends	30.70
SRDK03	—	DEK	265 Series	03	18"	.75"	30'	None	24.15
SRDK04	—	DEK	265 Series	04	14"	.75"	30'	None	24.70
SRSM01	—	SMT/QUAD	—	01	16"	1.5"	39'	None	23.10
SRPA01	1935C081470	PANASONIC	G1 Series	01	21.25"	1.5"	39'	None	29.40
SRPA02	—	PANASONIC	G1 Series	02	14.18"	1.5"	39'	None	24.15
SRPA03	—	PANASONIC	SPPG1 Series	03	28"	1.5"	29'	None	33.60

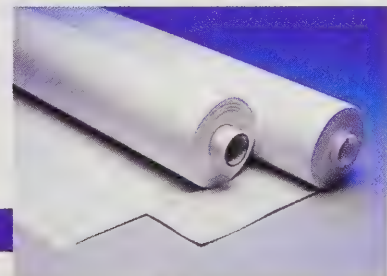
### For Vacuum Systems

P/N	Replaces OEM Roll Number	Make	Machine	Size	Core Length	Core ID	Roll Length	Cutback	Each
SVMP01	—	MPM	AP and UP Series	01	18"	.75"	39'	.5", 1 end	\$17.55
SVMP02	—	MPM	AP Series	02	18"	1"	33'	.5", 1 end	17.55
SVMP03	—	MPM	AP Series	03	25.25"	.75"	39'	.5", 1 end	19.00
SVMP04	—	MPM	UP Series	04	24.5"	.75"	39'	.5", 1 end	19.00
SVDK01	—	DEK	265 Series	01	21.25"	.75"	36'	None	28.85
SVDK02	133345	DEK	265GS Series	02	20.87"	.75"	36'	None	30.70
SVDK03	—	DEK	265 Series	03	18"	.75"	30'	None	24.15
SVDK04	—	DEK	265 Series	04	14"	.75"	30'	None	24.70
SVSM01	—	SMT/QUAD	—	01	16"	1.5"	39'	None	23.10
SVPA01	—	PANASONIC	G1 Series	01	21.25"	1.5"	39'	None	29.40
SVPA02	—	PANASONIC	G1 Series	02	14.18"	1.5"	39'	None	24.15
SVPA03	—	PANASONIC	SPPG1 Series	03	28"	1.5"	29'	None	33.60

## TECH SPRAY TECHROLL™ Stencil Underwipes

The TECHROLL wipes are available in 3 distinct grades of material. TECHROLL STANDARD wipes can be used in machinery that utilizes a vacuum- or standard-wiping process. The TECHROLL PLUS wipes offer high absorbency and strength. And the TECHROLL ULTRA wipes provide maximum absorbency and ultralow levels of particle generation. These SMT roll wipes meet all specifications for the DEK265GS and MPM1485 printers.

- Custom rolls available upon request



2370



2371



2372

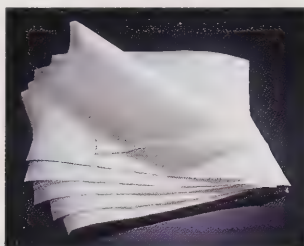
P/N	Description	Each
2370	TECHROLL STANDARD; DEK; core: 20.87" (W), .75" ID	\$27.95
2371	TECHROLL PLUS; DEK; core: 20.87" (W), .75" ID	30.90
2372	TECHROLL ULTRA; DEK; core: 20.87" (W), .75" ID	36.20
2380	TECHROLL STANDARD; MPM; core: 18" (W), .75" ID	16.20
2381	TECHROLL PLUS; MPM; core: 18" (W), .75" ID	16.55
2382	TECHROLL ULTRA; MPM; core: 18" (W), .75" ID	23.35



**JNJ Under-Stencil SMARTWIPES®**

Designed especially for cleaning SMT stencils and screen/stencil printing machines, these wipes effectively absorb solder pastes, flux residues, inks, and epoxies—with or without solvents. The 401 wipes are ideal for cleaning standard-, fine-, and ultra-fine-pitch stencil images; they resist tearing and shredding; are very low in lint; and keep stencil under-sides clean of excess residue—preventing solder-paste contamination on printed-circuit boards. When used in conjunction with JNJ SMT cleaner solvent, they make the most effective stencil-cleaning system available.

- 9" x 9" wipes



401

P/N	Description	Each
401	Under-stencil wipes, 300 per bag	\$25.00

**JNJ CFC-Free SUPERSATURATED SMARTWIPES**

Pre-saturated with just the right amount of solvent, these wipes eliminate waste and spills. They safely remove solder pastes, inks, and epoxies from screens, stencils, misprints, squeegee blades, and equipment.

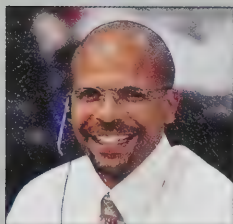
- No CFCs or HCFCs
- Handy reclosable dispenser • Individually dispensed
- High-quality
- 100% nonwoven polyester • 6" x 9" wipes



SW901HC50

SWS901HC

P/N	Description	Each
SW100IPA/DI	IPA/DI water SMARTWIPES, 100/pkg.	\$15.75
SW50IPA/DI	IPA/DI water SMARTWIPES, 50/pkg.	10.75
SW100AFR	Semiaqueous flux-remover SMARTWIPES, 100/pkg.	19.75
SW50AFR	Semiaqueous flux-remover SMARTWIPES, 50/pkg.	13.00
SWS901HC	Bench-top-electronics hand cleaner, 100/pkg.	15.75
SW901HC50	Bench-top-electronics hand cleaner, 50/pkg.	10.75



Need Help?  
Just Call.

**JNJ SMT Stencil Cleaner**

This product is ideal for cleaning stainless-steel stencils and electronic screen/stencil printers. It safely removes RMA, RA, and no-clean solder pastes and fluxes, and is an odorless, fast-drying solvent for use in automatic stencil-wiper assemblies and batch ultrasonic-cleaning machines—safe for use with most plastics. The solvency strength can be increased upon request.

- Odorless • Nonflammable • Excellent overall cleaner • Noncorrosive • Fast drying • Dries to zero residue • Removes difficult solder pastes with ease • Nonozone-depleting • Does not harm fiducials • Removes fluxes



SW100SMT

GA6SMT

SB6SMT

P/N	Description	Each
SW100SMT	Canister with 100 SuperSaturated SMARTWIPES	\$19.75
SB6SMT	1-pint trigger SmartSpray bottle, antistatic plastic	10.75
GA6SMT	1-gal container	29.25

**TECH SPRAY™ Non-CFC SMT Stencil Cleaner**

TECH SPRAY has developed a hydrocarbon-based, nonozone-depleting SMT stencil cleaner that cleans solder paste from screens, misprinted boards and equipment. SMT stencil cleaner's proprietary blend cleans most wet or dried thick film and solder paste compositions.

SMT stencil cleaner is available in a convenient pop-up container which includes 48 pre-saturated wipes. The wipes are made of a hydroentangled cellulose/polyester that has ultra-low particulate and chemical extractables. The lint-free construction of the wipes prevents contamination and clogging of fine-pitch screens. The container is anti-static and uses only metallic labeling to ensure proper ESD protection.



1693-PT

P/N	Description	Each
1693-DSP	Pop-up dispenser, contains 48 pre-saturated wipes	\$13.25
1693-PT*	1 pt w/trigger in antistatic plastic bottle	11.60
2358-50	9" x 9" wipe, 50/pkg	46.70

\* Must be sold in case quantities of 12.

**TECH SPRAY SMT Stencil Wipes**

TECH SPRAY has developed a wipe that is moistened with a blend of 99%-pure anhydrous alcohol and DI water.

This blend of solvents ensures easy removal of solder pastes and makes cleanup a breeze.

- Pop-up dispensing container with 48 wipes • Cleans stencils • Cleans squeegees • Cleans screens • Nonaggressive • Efficient cleaner



1608-DSP

P/N	Description	Each
1608-DSP	SMT stencil wipes, 48/container	\$9.55

**TECH SPRAY TECHCLEAN® Blue SMT Wipes**

These 9" x 9" wipes are comprised of hydro-entangled cellulose/polyester. The wipes are extra-absorbent with extra-low particulate and chemical extractables.

- Excellent for stencil cleaning
- Extra-absorbent • Nonabrasive
- Excellent strength—wet or dry • Low particulate generation



2359-300

P/N	Description	Each
2359-300	9" x 9" wipes, 300/bag	\$23.15

**TECH SPRAY TECHCLEAN® Stencil Wipes**

These new 4" x 4" wipes are very absorbent and low in particulate and nonvolatile residues. They are a synergistic blend of absorbent cellulose and polyester fibers with no chemical binders.

- Ideal for cleaning excess solder paste from SMT stencils • Excellent absorbency
- Achieve optimum cleanliness
- Superior dimensional stability
- Nonabrasive
- Low particulate generation



2361-1200

P/N	Description	Each
2361-1200	4" x 4" wipes, 1,200/bag	\$44.40



New Product: This symbol represents the industry's latest offerings.



## WELLER WQB2000 BGA/SMT Rework and Repair System

The new WELLER BGA/SMT rework system is capable of complete rework of BGA and SMT devices without thermal or physical damage. The control module stores 6 parameters: hot-gas temperature, hot-gas flow rate, preheat temperature, preheat time #1, preheat time #2, and reflow time. The precision hot-gas assembly used with the patented templates makes it possible to accurately remove, paste, and replace components. This patented technology enables complete rework and repair operations with a single unit—without a vision system.

WQB2000 includes: • 6 index pins (3 sets) • Training kit—with 2 clear boards, 1 BGA template, 1 BGA printing template, 1 QFP template, 1 QFP printing template, 1 BGA component, and 1 QFP component • Portable vacuum pen • Push-button release on vacuum head • Alignment square • Spatula • Accessory kit—with spacers, 2 different size vacuum nozzles, KAPTON tape, extra "O" rings, and extra rubber vacuum heads • Instruction manual • Instructions on how to determine the exact template sizes needed for each application—WELLER customizes templates upon request • Includes BGA and component oven as part of the training kit • A range of oven sizes is available

Features: • Controlled regulation of hot air to remove and reflow components • Built-in hot air and vacuum pick up • Adjustable pin-mounted board-holding device allows for easy removal of the board • For BGA and SMT rework



WQB2000



P/N	Description	Each
WQB2000	BGA/SMT rework system	\$7498.50

## WELLER WQB1500 QFP/BGA Print-and-Place Machine

The new WELLER WQB1500 print-and-place machine provides fast and accurate set-up, allowing you to place components with up to .005" accuracy, thereby reducing rework. The WQB1500 is ideal for contract houses, OEMs, and for those working with boards that have a small amount of BGA components. With a stable base, precision ball-slide heads, and its easy vacuum-release operation, this system is also ideal for prototyping, small production runs, and contract work. Its patented stencils and locating templates allow for flexibility and quick set-up. The WQB1500 comes with an easy-to-follow illustrated instruction manual.

• Modular head design—2 vacuum heads with push-button release to optimize printing and placement

The kit contains: • 6 index pins (3 sets) • Training kit with 2 clear boards, 1 BGA alignment template, 1 QFP template, 1 QFP printing stencil, 1 BGA printing stencil, 1 BGA component, and 1 QFP alignment component • 2 vacuum heads to optimize printing and placement • Push-button release on both vacuum heads • Alignment square • Spatula handle with interchangeable spatula sizes and knife blade • Accessory kit including spacers, 2 different size vacuum nozzles, KAPTON® tape, extra "O" rings, and extra rubber vacuum heads • Instruction manual • Instructions on how to determine the exact template size needed for each application—WELLER customizes templates on request



WQB1500

P/N	Description	Each
WQB1500	QFP/BGA print-and-place machine	\$3748.50

## WELLER WQB1000 QFP/BGA Placement Machine

The new WELLER WQB1000 placement machine features patented orientation templates for highly accurate placement of fine-pitch QFP or BGA components on circuit boards. The WQB1000 is ideal for contract houses, OEMs, and for those working with boards that have a small amount of BGA components. With a stable base, precision ball-slide heads, and an easy vacuum-release operation, this system is also ideal for prototyping, small production runs, and contract work. Its patented stencils and locating templates allow for flexibility, very quick set-up, and placement to .005" accuracy.

• Vacuum pick-up tool makes the difficult process of placement easy and repeatable • Adjustable tooling pins require no hard tooling or fixtures

The kit contains: • 6 index pins (3 sets)

• Training kit with 2 clear boards, 1 BGA template, 1 QFP template, 1 BGA component, and 1 QFP component • Portable vacuum pen • Push-button release on vacuum head • Alignment square • 10 templates (7 QFP and 3 BGA) • Accessory kit with spacers, 2 different size vacuum nozzles, KAPTON tape, extra "O" rings, and extra rubber vacuum heads • Instruction manual



WQB1000

P/N	Description	Each
WQB1000	QFP/BGA placement machine	\$2248.50





## WELLER Multiple-Application Rework Systems

The WRS Series systems are multiple-application rework and repair centers. A selection of 4 models allows you to choose 1 to best fit your needs. All models feature the EC1204A 54-W soldering iron, DS58 60-W inline desoldering pencil, and HAP1 100-W hot-air pencil. Other tools include the WT50 SMD tweezers, vacuum-pick-up pen, and dispenser for solder paste or adhesive. The WRS 7000 includes the WHA2000 700-W hot-air pencil with built-in vacuum pick-up and static-free air flow—for removing and replacing the largest of components.

- Self-contained desoldering and hot air • Shop air required for dispensing and vacuum pick-up • Closed-loop controlled handpieces • Digital display • Microprocessor control for the ultimate in accuracy • Lock-out equipped • Temperature set-back • Separate control of air-flow rate, time, and temperature • Burn-resistant cords • Full range of tips for rework and repair available • Hot-air and desoldering applications can be run without any separate switching • Temperature readout in Fahrenheit only • ESD-safe • UL Listed

P/N	Description	Each
WRS3000S	3-function rework system	\$2031.65
WRS4000	4-function rework system	2662.50
WRS5000	6-function rework system	4050.00
WRS7000	7-function rework system	5347.50



WRS7000

Features	WRS3000S	WRS4000	WRS5000	WRS7000
EC1204A Soldering Iron	•	•	•	•
DS58 Desoldering Pencil	•	•	•	•
HAP1 Hot-Air Pencil	•	•	•	•
WT50 SMD Tweezers		•	•	•
Vacuum-Pick-Up Pen			•	•
Solder-Paste Dispenser			•	•
WHA2000 Hot-Air Pencil				•

## WELLER WRS3000 Rework System

The WRS3000 is a self-contained, multipurpose, microprocessor-controlled rework system for soldering, desoldering, SMT, and wire-stripping applications. Any combination of 3 existing optional WELLER tools can be used at the same time. The timer function allows the user to program the unit to automatically set back the soldering temperature if it is not used within a pre-set amount of time (up to 60 min) and allows the hot-air flow to be timed to prevent damage to sensitive components. There is no need to make a manual switch between vacuum and hot air or to change hoses and vacuum lines.



WRS3000

Optional Tools

- Operator lock-out • Digital readout • Dimensions: 9.6" (W) x 4.1" (H) x 10.6" (L) • Power input: 300 W • Temperature range for hot air is 300 °F–980 °F, for solder/desolder it's 300 °F–850 °F • Maximum air flow for the hot-air pencil is 10 L/min, for desoldering vacuum it is 20.7 hg • Meets MIL-SPECS • ESD-safe • UL Listed • All tools sold separately

P/N	Description	Each
WRS3000	Power unit, 120 V, tools sold separately	\$1397.65
EC1201AP	40-W macro soldering iron, ETA tip, stand	110.85
HAP1	100-W hot-air pencil, stand, 2 tiplets	219.75
DS58	60-W in-line desoldering tool, 4006 tiplet	235.65
WT50	Thermal tweezer, 2 x 25 w	253.00
WST20	Temperature-controlled thermal wire-stripper, blades sold separately	380.65
58725726	12-, 16- and 24-AWG blades	48.40
58725729	12-, 14- and 24-AWG blades	48.30
58725732	14-, 18-, 22- and 26-AWG blades	48.30
58725718	Flat-cable stripper	51.65
58725723	Cutting knives	20.10

## WELLER Hot-Air Rework System

The WHA2000 provides self-contained hot-air and component-lift-off capabilities. Its exclusive ionization circuit eliminates the risk of static in the air stream, and an optional remote sensor can be connected to reduce potential thermal damage to components. The WHA2000 has precise temperature control (300 °F–1,000 °F) and 750 W of power to provide for quick removal or replacement of components. An optional finger remote or footswitch is available.

- Exclusive ionization circuit for ESD safety • 750 W of power • 10 to 50 liters-



WHA2000

- per-minute of air flow • Full range of nozzles • 7" Hg low-level vacuum for component lift-off • Optional sensor to prevent excess heat transfer to components • System includes control unit with hot-air tool, holders, and foot pedal

P/N	Description	Each
WHA2000	Complete, self-contained hot-air rework station with stand	\$1976.20
58736786	Remote sensor	258.90
58736780	Hand remote	80.50
51504599	Stand for handpiece	97.30
53606099	Footswitch	88.60



**WELLER WRS 2000 Hot-Gas Workstation**

This versatile electronically-controlled workstation features all the key functions that are necessary for SMD rework and repair of circuit boards. The benefits of 3 operating functions are integrated into 1 compact unit (pick-and-place, dispensing of solder paste or adhesives, and soldering and desoldering of components).

- Needs shop air • Temperature control for soldering/desoldering iron: 300 °F–850 °F • Hot-air pencil: 300 °F–980 °F • Power supply: 145 W • Dimensions: 9.5" (W) x 10.6" (D) x 4.25" (H) • ESD-safe
- Potential balance and compound air: 3–8 bar
- Hot-air pencil: 100 W • Soldering iron: 25 W–80 W • Desoldering iron: 50 W–80 W

The system includes a pick-and-place tool dispenser, hot-air pencil, and stand. All functions are activated either by a finger- or foot- switch.



WRS2000

P/N	Description	Each
WRS2000	Hot-gas workstation	\$2377.80

**WELLER WRS1000 Rework System**

The WRS1000 is a full-service self-contained rework station. It can be used to rework IC boards and SMT components. It comes with a 100-W hot-air pencil, stand, funnel, 2 tiptets, and a set of stainless-steel tubes for making custom-designed air nozzles. The hot-air-pencil temperature is continuously adjustable from 300 °F to 1,000 °F and is accurate within  $\pm 50$  °F. The unit is capable of running any of the WELLER soldering/ desoldering tools (ADP1 adapter must be used).



WRS1000

P/N	Description	Each
WRS1000	WELLER rework system, 120 V, hot-air pencil and stand	\$907.10
ADP1	Tool adapter	41.15

**OK INDUSTRIES Semiautomatic SMT Rework System**

The all-new FCR-2200 Series is a focused forced-convection SMT rework system with vacuum pick-up. Utilizing a self-contained air source, the FCR-2200 regulates air flow and temperature to rework a wide variety of components from discretes to PLCCs and QFPs. Its unique 3-mode operation provides manual or semi-automatic control for component removal or replacement.

- Manual mode: continuous hot-air flow, on-demand air flow, or on-demand vacuum—all via footswitch • Auto-remove mode (sequenced and timed): from hot air, to hot air with vacuum, to hot-air shut off, to vacuum release
- Auto-replace mode (sequenced and timed): from vacuum, to hot air, to hot-air shut-off

**Specifications**

- Meets all MIL-SPECS • Input voltage: 115 V, 50–60 Hz • Heater: resistive, 300 W, 28 V • Heater control: closed loop, thermocouple-sensor feedback
- Air source: high-efficiency diaphragm pump • Air flow: variable 3 to 20 l/min
- Output temp. range: 392 °F–932 °F (200 °C–500 °C) • Modes: manual, auto-place, and auto-remove • Heater timer: 0 s–180 s when used with auto-place or auto-remove modes • ESD-safe • UL Listed

**Systems Include the Following:**

- Power base with pump • Air-flow meter/temperature-control module
- Mode selection/ heater-timer module • Handpiece with vacuum-cord and connector (FCT-2228)
- Handpiece holder • High-temperature, silicone-rubber vacuum pads; 10 pcs. • Nozzle-removal tool
- Vacuum-pad removal tool
- Instruction manual • Call for free demonstration video



FCR-2201

WSA

P/N	Description	Each
FCR-2201	Forced-air-convection SMT rework system with vacuum and heater timer, 115 V	\$1695.00
WSA	RTS-A tool stand and RBH-A board holder	1250.00
WSB-1	SMW-1101 pre-heater with tool stand and RBH-B board holder	2000.00

**OK INDUSTRIES SMT Hot-Air Rework Systems**

The FCR-1000 Series systems are low-cost and feature closed-loop temperature and air-flow control. Unlike the FCR-2200 Series systems, they do not have a timer or vacuum, but apply focussed heat on the solder joint for quick, safe, SMT rework.

- Features:
- Remove and replace discrete, SOIC, PLCC, and QFP components
  - Closed-loop, variable temperature control
  - Variable air flow adjusts to thermal demands of board
  - Self-contained air source provides for easy set up
  - Fully grounded and static-safe system
  - Optical isolation with zero voltage switching
  - Over 40 nozzles available

- System includes:
- Air-flow meter/temperature-control knob
  - Focused-convection handpiece
  - Power base with pump
  - Handpiece holder
  - Nozzle-removal tool • 2-yr. warranty



FCR-1001



STATIC SAFE

P/N	Description	Each
FCR-1001	Rework system, 115 V, 50 Hz/60 Hz	\$995.00

**OK INDUSTRIES Precision Dispensing System**

The TS9151 is a precision fluid-dispensing system with vacuum control of all viscosities of fluids using air-powered disposable syringes. This solid-state controller provides accurate and repeatable dispensing cycles. This unit offers an adjustable vacuum feature for controlling the drip of fluid between dispense cycles. Three dispense- time ranges are included to provide controlled time shots from 0.01 s to 30 s with 1 touch or the interruptible actuation option.

- Timer: solid-state, digital, integrated circuitry • Solenoid: 0.18 CV factor, constant flow
- Lighted function switches
- Adjustable vacuum up to 15" Hg • Micro-action foot switch
- 10-year warranty



TS9151

P/N	Description	Each
TS9151	Dispensing system	\$495.00
OKD-KT	Dispensing component kit: tips, syringe hose assembly, stand, and filters assemblies, adapters	105.00



# OK INTERNATIONAL Mixed-Technology Rework Systems

These are multiple-function systems for reworking mixed technology. The MTR-5001 comes standard with the seven following handpieces: convection tool, hot-air pencil, desoldering handpiece, SMTweezer for quick removal of SMT components, high-power soldering iron, vacuum pencil, and paste/flux dispenser. The MTR-4001 includes all of the same handpieces as the MTR-5001 less the paste/flux dispenser. The MTR-3101 includes all of the MTR-5001's handpieces less the paste/flux dispenser, high-power soldering iron, and the desolder handpiece.

- ESD-safe, meets MIL-STD-2000A and MIL-STD-

1686 • Hot-air pencil for safe convection reflow of SMT components • High-capacity, through-hole desoldering handpiece • SMTweezer for quick removal of SMT components • High-power SAI-690 for touch-ups and hand-soldering of all component types • Self-contained vacuum pencil for SMT component placement • Call for free demonstration video • 2-year warranty

## MTR-5001/MTR-4001 Temperature Control Range

- 1, 2, DG, and SHP: closed-loop RTD feedback,

450 °F–850 °F (230 °C–455 °C) • Focused convection tool: closed-loop thermocouple feed back, 392 °F–932 °F (200 °C–500 °C)

## MTR-3101 Temperature Control Range

- 1, 2, and SHP: closed-loop RTD feedback, 450 °F–850 °F (230 °C–455 °C) • Focused convection tool: closed-loop thermocouple feed back, 392 °F–932 °F (200 °C–500 °C)



MTR-5001

WSB-1

System Reference Chart	MTR-5000	MTR-4000	MTR-3100
FD-1000 Paste/Flux Dispenser	•	N/A	N/A
VP-50 Vacuum Pencil	•	•	•
FCT-2228 Focused Convection Tool with Vacuum Pickup	•	•	•
SHP-1060A Hot-Air Soldering Pencil	•	•	•
QP-2890 Quick Pick	Optional	Optional	N/A
DGM-1 Drill Module	Optional	Optional	N/A
SAI-644 SMTweeze	•	•	•
SAI-690 High-Power Iron	•	•	Optional
SAI-640 Micro Iron	Optional	Optional	Optional
DG-28110A Desolder Handpiece	•	•	N/A

P/N	Description	Each
MTR-5001	7-function rework system, built-in pneumatic dispenser (shop air required)	\$4295.00
MTR-4001	6-function rework system	3795.00
MTR-3101	4-function rework system	2495.00
WSA	RTS-A tool stand and RBH-A board holder	1400.00
WSB-1	SMW-1101 preheater with tool stand and RBH-B board holder	2000.00



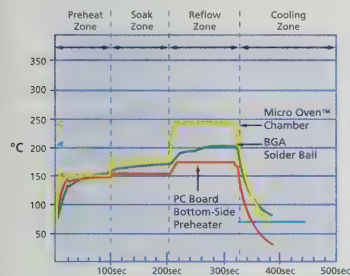
## OK INDUSTRIES BGA-2000 MICRO OVEN™ Rework System

### For Accurate Duplication of Original Reflow Profiles

This rework system is engineered to allow efficient, reliable rework of BGAs and other fine-pitch QFPs. Utilizing a microprocessor profile controller, the operator simply selects the appropriate 4-zone removal or replacement profile and starts the rework sequence. Profiles can be stored, recalled, and edited with a touch of a button—and displayed on a monitor via an optional RS-232 interface.

Additional features: • Built-in automatic vacuum pickup • Air-chamber temperature uniform to  $\pm 5^\circ\text{C}$

System includes: • BGA-2000 power base with control modules and air-reflow gauge • BGA and QFP reflow-head assembly including a MICRO OVEN nozzle • Rework-base and stand assembly including convection bottom-side heater • Laser alignment system • Open-ended PC-board holder • 20-pc. set of high-temp. vacuum pads (4 sizes) • Nozzle- and vacuum-pad-removal tool set • 90-W soldering iron and holder • Blade tip for soldering iron • External thermocouple and KAPTON tape for temperature monitoring

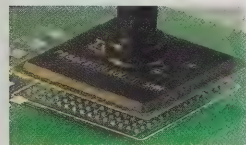


BGA-2101L-WSC

P/N	Description	Each
BGA-2101L-WSC	BGA rework system with PC Interface	\$13495.00

## OK INDUSTRIES BGA and Fine-Pitch MICRO PLACER™

### High-Resolution Vision System



This ergonomic bench-top optical-monitoring system allows you to perform precise, repeatable alignments of component leads or balls with the mating land patterns on PC boards. The system can also be used for inspecting freshly stencilled solder paste before placement. This system incorporates a precision-optics package that provides split-

field imaging with a dual-image overlay of the component leads and the PC-board land pattern. The operator aligns the component to the board accurately and repeatably by employing the X, Y, and theta (rotation) controls while viewing the process at high magnification (10x–50x) on a 20" high-resolution color monitor.

System includes: • P-2000 base unit with optical-monitoring/placement head, high-resolution camera, and integral board holder • 20" high-resolution monitor • Power-supply unit with vacuum pump • Open-ended board holder (integral) • Vacuum nozzle and calibration tip • Tooling plate to accommodate QFP stencils • Adjustable V-block tooling plate to accommodate BGA packages • 115 V



MP-2001

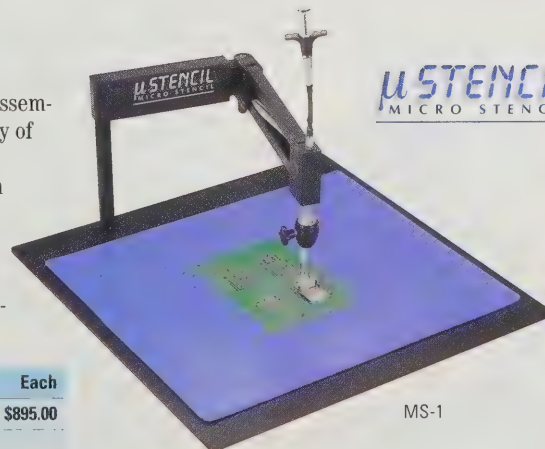
**μPLACER**  
MICRO PLACER

P/N	Description	Each
MP-2001	MICRO PLACER system	\$12995.00

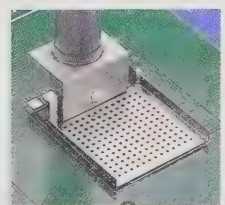
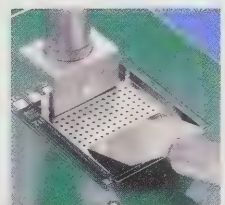
## OK INDUSTRIES Single-Component Micro Stencil System

Designed for low-volume production, rework, and prototype PC-board assembly, this unit overcomes the challenges of solder placement and delivery of solder pastes in precise, repeatable amounts to small work areas. An ergonomic articulated arm and spring-loaded actuator allow for a clean "snap-off" of the stencil from SMT boards involving BGA, QFP, and PLCC components.

System includes: • Base plate with articulating arm • Metal squeegee with 3 blades • Solder-paste syringe • Cleaning brush and tray • Static-dissipative mat



**μSTENCIL**  
MICRO STENCIL



MS-1

P/N	Description	Each
MS-1	Micro stencil system	\$895.00

NOTE: Additional tooling plates are available—call for details.



## OK INDUSTRIES Hot-Air Soldering System with Hot Plate Reflow System

The SMT-1161-V is a non-contact, hot-air soldering system for most SMDs. Using forced-air convection, it is designed for low-thermal-stress reflow. It can be used for SMT-component removal of chips and SOIC—and when used with the SA-751 hot plate, it allows for soldering on high-thermal-demand substrates.

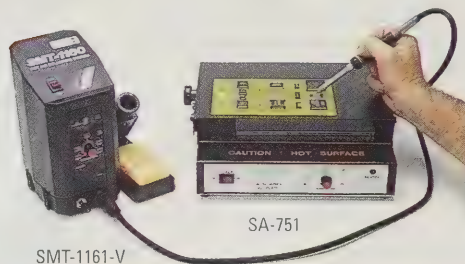
### SMT-1161-V Hot-Air Soldering Station

- Self-contained pump for convection reflow
- Variable air-flow • Variable, closed-loop temperature control • ESD-safe housing and iron
- Includes nozzle kit: round, oval and angled nozzles • Specialized split- and fan-nozzle options

### SA-751 Hot Plate Reflow System

- Reflow single-sided SMT boards • Pre-heat ceramic and copper invar substrates • Pre-heat substrates with large ground planes • Temperature uniformity of 5 °C over entire surface

- Variable temperature control • Zero-voltage heater switching • Hinged hood creates an oven-like environment for reflow • ESD-safe construction • UL and CSA approved



P/N	Description	1	2-10	11+
SMT-1161-V	Base 115 V hot-air pencil, NK-1060A nozzle kit, iron holder	\$745.00	\$685.00	\$635.00
NK-1060A	Nozzle kit: round, oval and angled (included in SMT-1161-V)	39.00	35.85	33.40
SA-751	SMT hot-plate reflow system; 115 V	695.00	665.20	629.25

## WELLER WHA300 Self-Contained Hot-Air Station

The new WELLER WHA300 features 700 W of heating power and an extremely compact size that uses less space on the bench. Temperature and air flow are controlled via a highly visible front panel. Air flow is activated by a finger switch on the handpiece or with an optional foot switch. A full range of nozzles are available.

- ESD-safe • Built-in handpiece holder • Adjustable air flow from 10 liters per minute to 50 liters per minute



WHA300

Weller

P/N	Description	1-5	6+
WHA300	Self-contained hot-air station	\$952.50	\$844.55

P/N	Description	Each
58739740	Manual remote control	\$84.80
53606099	Foot switch	91.25

## WELLER QFP Lead Repair Kit

This new kit allows you to simplify procedures and reduce costs associated with the repair of QFP components. Bent and deformed leads on gull-wing quad-flat-pack components can be manually restored to their correct shapes and positions—eliminating the need to return them to the factory. A detailed instruction manual makes the process easy.

- Patented precision alignment templates
- Lab-grade granite plate—provides an even, stable work surface that ensures coplanar lead alignment

- 2 lead-straightening probes—make it easy to place bent leads into their respective template depressions • Precision tweezers • Vacuum pick-up tool • KAPTON® tape • Rugged storage box • Instruction manual

### Templates Included in Kit

Component No.	Pitch	Pins
QFP144	.50"	144
QFP208	.50"	284
QFP240	.50"	40
QFP304	.50"	52
QFP144	.65"	68
QFP160	.65"	84
QFP184	.65"	132

P/N	Description	1-5	6+
WLSK1000	QFP lead repair kit	\$495.00	\$438.90

NOTE: Replacement and other size templates are available.



WLSK1000

## EDSYN Hot-Air SMD Workstation

- Temperature controlled (400 °F–800 °F) (±6 °C) • Self-contained built-in air source
- Meets all MIL-SPECS • Wide variety of nozzle sizes • ESD-safe • UL Listed



P/N	Description	Each
1036DX	Self-contained hot-air SMD workstation with pick-up tool; 50 W	\$941.05
1032	Same as above only requires shop air (not shown)	649.60
1036	Self-contained hot-air SMD workstation without pick-up tool, 70 W	834.80
1052	Same as above only requires shop air	904.05
1052HP	Hot-air SMD workstation with hot-air tool and high-performance soldering tool (requires shop air) (not shown)	1039.70

## EDSYN SMT Hot-Gas Rework Station

This is the most practical site-preparation tool for BGA, PLCC, and QFP rework. Simple, repeatable and safe for both the board and the operator.

- No sharp edges to damage boards • Aids in ISO 9000 compliance • External calibration
- Requires shop air • Nitrogen optional • Meets DOD-STD-2001B, DOD-STD-1686, DOD-HDBK-263
- ESD-safe • UL Listed



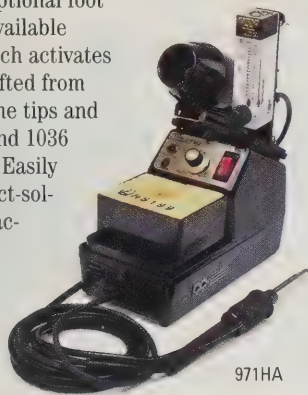
P/N	Description	Each
TSX70	Complete station with TSX713 tip, sponge, and all filters	\$1908.20
TSX713	Standard nozzle	49.50
TSX716	Long-reach needle nozzle	54.20
TSX717	Long oval nozzle	60.20
TSX715	Focus nozzle for use with TSX716	10.65
AF625	Solder collector filter, 10/PK	5.90
AF629	Condensor filter, 10/PK	5.90
AF040	Condensor filter, 10/PK	5.75
RSX72	Retaining sleeve	51.05
AFX73	Condenser and filter	58.25



## EDSYN LONER ATMOSCOPE SMT Hot-Air Station

A new modular design provides unique versatility and outstanding performance for hot-air or contact rework techniques.

- Runs on shop air or nitrogen, 20 psi–80 psi
- External calibration for ISO 9000 compliance
- Graduated flow regulator monitors air flow in SCFH • Optional foot switch (FS205) available
- Built-in air switch activates air when tool is lifted from holder • Uses same tips and nozzles as 1032 and 1036 hot-air stations • Easily converts to contact-soldering fume extraction with OPT823 fume-extraction kit



971HA

P/N	Description	1-5	6+
971HA	LONER ATMOSCOPE SMT hot-air station	\$607.55	\$575.00
FS205	Foot switch	92.90	85.75
OPT823	Fume-extraction kit	337.05	303.30

## EDSYN Multi-Tasking Rework Station

- Requires shop air • Independently temperature controlled (400 °F–800 °F) • Built-in air regulator can be used with foot-switch • Comes complete with soldering, desoldering, and hot-air tools • Wide variety of nozzle sizes
- All 3 hand-pieces can be used at 1 time
- Meets all MIL-SPECS • ESD-safe • UL Listed



ZD906

P/N	Description	1-5	6+
ZD906	Multi-tasking rework station	\$1096.50	\$995.00

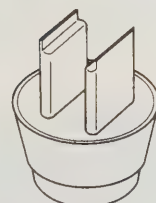
## WELLER Nozzles for the WHA300, WRS 7000, WHA700, WHA1000, and WHA2000



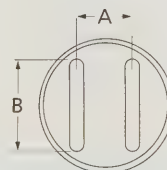
P/N	Description	1-11	12+
58736804	PQFP100, PQFP128, BQFP100, PLCC68	\$47.90	\$44.75
58736807	PLCC52, PQFP84, PQFP56	47.90	44.75
58736814	PLCC44, PQFP52, PQFP80, PQFP64	47.90	44.75
58736818	PLCC28, PQFP44, PQFP52	47.90	44.75
58736833	PQFP120, PQFP128, PQFP132, PQFP144, PQFP160, PQFP184, PQFP208, PLCC84	60.00	56.10
58736839	PLCC20, CQFP24, LCCC14, LCCC24	47.90	44.75
58736819	Adapter for HAKKO and LEISTER nozzles	17.15	16.10

NOTE: Call for additional nozzles.

## OK INDUSTRIES Nozzles for the FCR Series SMT Rework System



TSOP/SO Packages

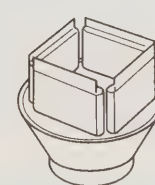


### PLCC Package Styles

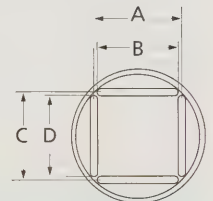
P/N	Package	A	B	C	D	Each
N-P20	PLCC-20	.469"	.300"	.469"	.300"	\$115.00
N-P28	PLCC-28	.569"	.400"	.569"	.400"	115.00
N-P32	PLCC-32	.664"	.500"	.664"	.400"	115.00
N-P44	PLCC-44	.769"	.600"	.769"	.600"	115.00
N-P52	PLCC-52	.870"	.700"	.870"	.700"	115.00
N-P68	PLCC-68	1.071"	.900"	1.071"	.900"	115.00
N-P84	PLCC-84	1.276"	1.100"	1.276"	1.100"	115.00

### SOIC Package Styles

P/N	Package	A	B	Each
N-S8	SOIC 8	.267"	.210"	\$115.00
N-S16	SOIC 14, 16	.267"	.400"	115.00
N-SL16	SOL 14, 16	.416"	.425"	115.00
N-SL20	SOL 20, 20J	.416"	.525"	115.00
N-SL24	SOL 24, 24J	.416"	.625"	115.00
N-SOJ32	SOJ 32	.530"	1.000"	115.00



PLCC/BQFP/QFP Packages



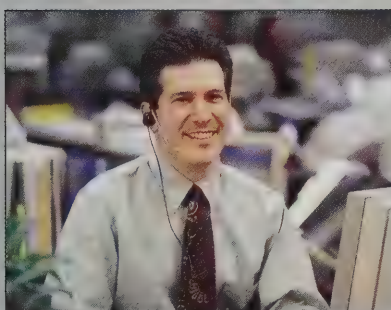
### QFP/BQFP Package Styles

P/N	Package	A	B	C	D	Each
N-Q10	QFP-44	.526"	.400"	.526"	.400"	\$115.00
N-Q14	QFP-52, 80	.682"	.550"	.682"	.550"	115.00
N-Q1420	QFP-64 QFP-80 QFP-100	.920"	.790"	.712"	.550"	115.00
N-Q2626	QFP-208	1.170"	1.03"	1.170"	1.03"	180.00
N-Q28	QFP-120 QFP-128 QFP-144 QFP-160	1.230"	1.100"	1.230"	1.100"	115.00
N-Q4040	QFP-304	1.718"	1.568"	1.718"	1.568"	180.00
N-BQ23	BQFP-100	.880"	.650"	.880"	.650"	115.00
N-BQ28	BQFP-132	1.086"	.850"	1.086"	.850"	115.00

### Hot-Air Nozzle Kit

The kit contains an assortment of nozzles for the most popular SMT package sizes. It includes 1 each of the following: N-D25A, N-P20, N-P28, N-P44, NP-52, N-P68, N-P84, N-Q1420, N-S8, N-S16, N-SL24, and N-BQ23.

P/N	Description	Each
NK-EZ12	Mixed nozzle kit, 12 pcs.	\$995.00



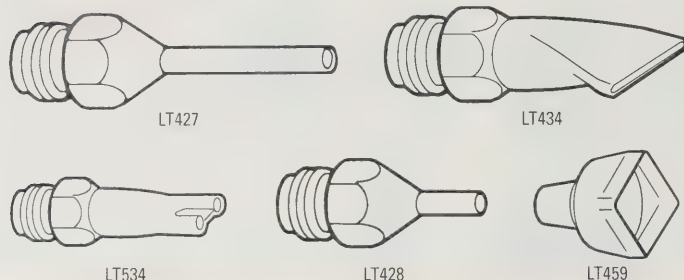
Need Help? Just Call.



We provide world-class quality ISO-9002-certified services and facilities.

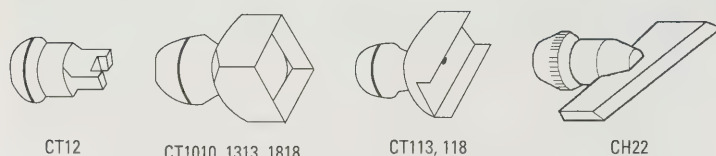


## EDSYN SMD Hot-Air Tips for the 1032, 1036, ZD906, 971HA, and MCS100HA



P/N	Description	Dimensions		1-9	10+
		Tip Size	Reach		
LT427	Single-nozzle tip	.02"	.38"	\$10.10	\$9.25
LT428	Single-nozzle tip	.06"	.25"	10.10	9.25
LT434	Fan tip	.46"	.23"	18.00	16.00
LT534	Dual-flow tip	.20"	.46"	22.40	20.45
LT459	Quadra-flow tip	.80" x .80"	PLCC-52	119.85	109.90

## EDSYN CROWN TIP™ Line



These tips are for SMD rework—for use with all of EDSYN's current soldering stations.

- Quad-tips for: PLCC; LCCC; QFDs and other 4-sided devices
- Tunnel tips for: SO and SOMC package sizes
- Fork tips for: chips, caps, and other small 2-sided devices
- Hammer-head tips: for gull-wings
- Must be used with an adapter

P/N	Description	1-9	10+
CT12	Fork for SOT-23	\$30.05	\$28.55
CT31	Fork for 1206, 1210	30.05	28.55
CT113	Tunnel for SOIC-20	42.05	39.95
CT118	Tunnel for SOIC-28	42.05	39.95
CT510	Tunnel for SOIC-14, 16	42.05	39.95
CT1010	Quad for PLCC-20	75.20	71.45
CT1313	Quad for PLCC-28	75.20	71.45
CT1818	Quad for PLCC-44	75.20	71.45
CH22	Hammerhead tip, .87"	48.05	45.00
CTA02	Adapter for use on hollow heaters	6.95	6.30
AC735	Heat-accumulator insert for use on hollow heaters	2.85	2.70
CTS71	Retaining sleeve for use on hollow heaters	8.45	7.80
HPA02	Tip adapter for use on high-performance style heaters	13.50	12.85
LUA35H	Heat-accumulator insert for use on high performance style heaters	5.20	4.90
HPS72	Retaining sleeve for use on high performance style heaters	8.45	7.80

NOTE: Other sizes and configurations are available on all tips.

## EDSYN SOLDAVAC® Air-Pressure and Vacuum Pick-Up System

SOLDAVAC's unique system allows you to pick up a component using positive air pressure or vacuum. In its positive-air-pressure mode air is blown at the component to lift and cool it at the same time. The system works well on a variety of SMD sizes using air pressure or vacuum.

- Requires clean and dry shop air, 60 psi to 90 psi
- ESD-safe
- Quiet operation
- Comfortable, ultralightweight tool
- Equipped with vacuum-release valve
- Easy adjustment knob for vacuum or air pressure
- Use as a blower for cleaning or cooling components
- A variety of suction-cup sizes is available



VA175

P/N	Description	1-3	4+
VA175	SOLDAVAC pick-up system	\$317.65	\$301.75

## KESTER No-Clean SMT Repair Kit

This complete kit is ideal for all your rework and touch-up soldering applications.

- Kit includes:
- 186 no-clean flux pen
  - 63/37 no-clean wire solder (.020")
  - Tip tinner
  - 951 no-clean desoldering braid
  - Vacuum handling tool



82-5000-0042

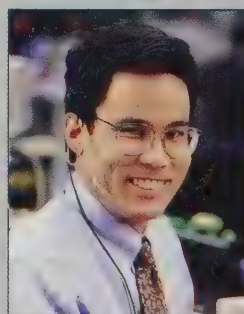
P/N	Description	Each
82-5000-0042	No-clean SMT repair kit	\$14.95



**New Product:** This symbol represents the industry's latest offerings.



We provide reduced pricing on large-quantity orders.



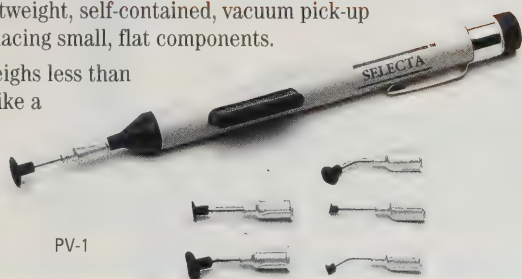
If You Don't See  
What You Need,  
Just Call.



## EXCELTA PEN-VAC®

The PEN VAC is a lightweight, self-contained, vacuum pick-up tool for picking and placing small, flat components.

- Lifts up to 50 g • Weighs less than 1 oz • Fits in pocket like a fountain pen



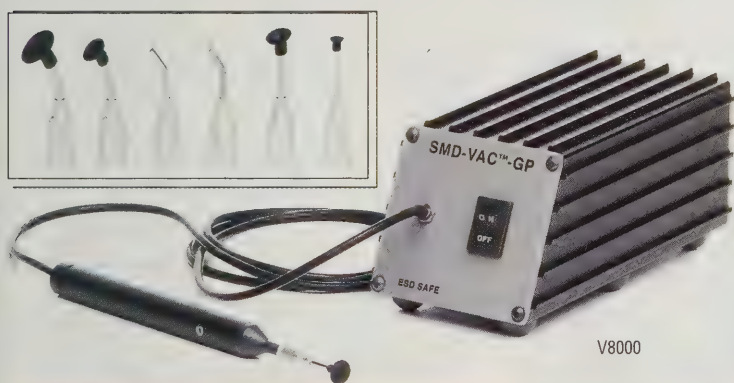
PV-1

P/N	Description	1-9	10-24	25+
PV-1	PEN VAC Jr, S, M cup, 2 bent probes	\$33.85	\$31.05	\$29.65
PV-1-ESD	ESD-safe PEN VAC Jr, S, M cup, 2 bent probes	42.25	38.90	37.15
PV-1-LB-ESD	ESD-safe bent probe, 3/8" cup	1.65	1.50	1.45
PV-1-MB-ESD	ESD-safe bent probe, 1/4" cup	1.65	1.50	1.45
PV-1-SB-ESD	ESD-safe bent probe, 1/8" cup	1.65	1.50	1.45
PV-1-LS-ESD	ESD-safe straight probe, 3/8" cup	1.65	1.50	1.45
PV-1-MS-ESD	ESD-safe straight probe, 1/4" cup	1.65	1.50	1.45
PV-1-SS-ESD	ESD-safe straight probe, 1/8" cup	1.65	1.50	1.45

## VIRTUAL INDUSTRIES SMD-VAC™-GP

This compact, general-purpose vacuum handling tool plugs directly into a 110-V-AC outlet. It can handle any of the surface-mount components used in the industry today. The long-life-diaphragm vacuum pump generates 6 inches of mercury. The unit automatically connects to a ground with a 3-wire power cord. It comes complete with the following features:

- 4 ft of vacuum hose #V3030 • Set of 7 vacuum tips • Vacuum pick-up handle #3020-RF • Measures: 75 mm x 152.5 mm x 62.2 mm (approximately 3" x 6" x 2-1/2") • Rubber no-skid feet



V8000

P/N	Description	Each
V8000	General-purpose vacuum handling tool	\$98.50

## VIRTUAL INDUSTRIES HANDI-VAC™

- Lowest priced vacuum handling kit • Simple design and operation • ESD-safe • Includes: tool and 4 vacuum cups and probes



HV-Kit-B

P/N	Description	Each
HV-Kit-B	HANDI-VAC kit	\$9.95

## VIRTUAL INDUSTRIES PORTA-WAND™ Vacuum Handling Tool for Wafers

- Portable self-contained continuous-vacuum system • Uses no hoses, replaces tweezers and hose-style wands • Battery operated, totally rechargeable in its own stand • Ergonomic rounded design is easy to hold • Class-1-clean-room- and ESD-safe • Lightweight, weighs less than 5 oz • Continuous run-time of 3 hr to 4 hr per charge • Easily lifts over 500 g • Kit includes: PORTA-WAND, in-stand battery charger, and wafer tip (as specified)



VPW6000-MW4



P/N	Description	Each
VPW6000-MW4	PORTA-WAND unit for up to 4" wafers	\$795.00
VPW6000-MW6	PORTA-WAND unit for up to 6" wafers	795.00
VPW6000-MW8	PORTA-WAND unit for up to 8" wafers	795.00

## VIRTUAL INDUSTRIES PAC-VAC™

- Battery-operated vacuum handling tool • Portable and lightweight • ESD-safe • Runs up to 8 hr on a 9-V battery • Conveniently clips to belt or smock • Includes: PAC-VAC unit, 4' straight vacuum hose, 4' coiled vacuum hose, set of 7 vacuum tips, vacuum pick-up handle, and 9-V battery



V3200

P/N	Description	Each
V3200	PAC-VAC vacuum handling tool	\$149.50





## Without continuous testing, here are your choices: lose money or lose money.

### Increase productivity and yield by continuously monitoring wrist straps right at the workstation.

It's simple. Wrist straps have to be tested over and over to make sure they're working. Otherwise you run the risk of ruining sensitive components. But without continuous monitoring, your employees have to leave their workstation every time they test their straps. And every time they get up, productivity goes down.

Luckily, 3M has a way to keep them in their place. With our new Model 724 Continuous Workstation Monitoring system, wrist straps and work surface



*In addition to the new 724 Work Station Monitor, 3M Electronic Handling & Protection Division is pleased to present the new Model 725 Wrist Strap Monitor. A compact, battery-powered unit that monitors a single wrist strap, it can be used in both manufacturing and field service environments.*

connections are monitored right at the workstation. Your employees are now more productive, *and* you have complete confidence that your wrist straps are guarding against static discharge every minute of the day.

Our Model 724 Continuous Workstation Monitoring system is just one of the many pieces of test and monitoring equipment that 3M has available to ensure your static-safe procedures are working as they should. Proving once again that with 3M, you just can't lose.

For additional information, please visit the @ONCE web site at <http://www.4atonce.com> or call (800) 261-9602, Ext. 4002



# 3M continuous static-control monitors

## 3M 724 Continuous Static-Control Workstation Monitor

The 724 enables you to reliably test wrist straps, personnel, work surfaces, and ground connections on a continuous basis. It notifies you instantly of static-control equipment failures to save you time and money—and it eliminates costly audits and record keeping.

- Monitors primary worker and visitor at workstation, wrist-strap, bench-top, and ground connection
- Audible and visible alarms
- Eliminates audits and record keeping
- Selectable test voltages and resistance limits
- Third wire ground provided through AC adapter

## 3M 725 Continuous Static-Control Wrist-Strap Monitor

The 725 notifies you instantly if your wrist-strap malfunctions or if it is worn improperly, assuring you that this important static-control safeguard is effectively working during the entire process of manufacturing, testing, or repairing of ESD-sensitive electronic equipment. The 725 uses DC current to make a resistance determination. It continuously emits a signal that is returned through a special wrist strap and cord that contains 2 separate sets of independent conductors.

- Measures operator resistance
- Resistor bypass warning
- Safe, low-current signal
- Battery powered
- Ground-clip disconnect warning
- Dual ground paths
- Passive system activation
- Parking clip allows mobile users to silence the ground clip disconnect alarm
- Optional belt clip available

## Continuous-Monitor Accessories

The 3M 732 remote input jack comes standard with the 724 workstation monitor, and is available separately. It provides 2 phone jacks, 1 for the primary worker and 1 for a visitor to the work area.

The new 3M 733 dual remote splitter can be used in conjunction with the 724 workstation monitor. It offers the versatility of grounding and monitoring 2 users at independent workstations that are in close proximity.

The 3M 3057 stand-by jack allows the user to disconnect the ground cord from the wristband and leave the workstation without deactivating the 724 workstation monitor. The user simply detaches the cord from the wristband and plugs it into the 3057. When the jack is grounded, the green light illuminates and the yellow "caution" lamp slowly flashes.

Dual-conductor fabric wrist straps are available in 3 fixed sizes with 5' coil cords. An adjustable fabric band, the 2368, is also available. Dual-conductor metal expansion bands are also available in 3 fixed sizes with 5' coil cords. They are recommended for use in clean rooms and for applications that require an extended band life.



P/N	Description	1-3	4-9	10+
725	Wrist-strap monitor	\$73.00	\$69.00	\$65.00
724	Workstation monitor with 732 remote jack	167.20	158.00	148.00
732	Replacement remote input jack	22.10	20.80	19.40
733	Dual remote splitter kit	46.55	43.75	40.80
723	Belt clip for 725	34.20	32.60	29.25
3057	Stand-by jack	8.95	8.40	7.85
2380	Monitor/table-mat replacement cord	13.05	12.30	11.50
2389	Monitor/table-mat interconnect cord	13.40	12.60	11.75

## Dual-Conductor Fabric Wrist Straps

P/N	Description	1-9	10-19	20+
2361	Fabric wrist strap and 5' ground cord, small	\$33.75	\$31.75	\$29.60
2362	Fabric wrist strap and 5' ground cord, medium	33.75	31.75	29.60
2363	Fabric wrist strap and 5' ground cord, large	33.75	31.75	29.60
2364	Fabric wrist strap only, small	13.65	12.80	11.95
2365	Fabric wrist strap only, medium	13.65	12.80	11.95
2366	Fabric wrist strap only, large	13.65	12.80	11.95
2368	Fabric wrist strap only, adjustable	13.90	13.05	12.20

## Dual-Conductor Metal Wrist Straps

P/N	Description	1-5	6-9	10+
2381	Metal wrist strap and 5' ground cord, small	\$48.50	\$45.60	\$42.55
2382	Metal wrist strap and 5' ground cord, medium	48.50	45.60	42.55
2383	Metal wrist strap and 5' ground cord, large	48.50	45.60	42.55
2384	Metal wrist strap only, small	35.50	33.35	31.15
2385	Metal wrist strap only, medium	35.50	33.35	31.15
2386	Metal wrist strap only, large	35.50	33.35	31.15

## Dual-Conductor Wrist-Strap Ground Cords

P/N	Description	1-5	6-9	10+
2360	5' coil cord	\$26.10	\$24.55	\$22.90
2370	10' coil cord	29.85	28.05	26.20
2371	20' coil cord	36.85	34.65	32.30

## 3M Field-Service Kit with 725 Wrist-Strap Monitor

Service technicians working on sensitive electronic equipment in the field require the same protection against static-electricity problems as that afforded workers at permanent static-safe workstations in a manufacturing facility. Until now, there has been no convenient way to test a wrist strap or the condition of a ground cord while in use. The new 3M 8507 field-service kit, with 3M 725 wrist-strap monitor, bundles together 2 static-control products to give a field technician the same continuously monitored static-protected working environment as that enjoyed by workers in a manufacturing facility.

- 8507 kit includes:
- Static-dissipative work surface
  - 725 portable wrist-strap monitor
  - 2368 dual-conductor fabric wristband, adjustable
  - 2370 dual-conductor wrist-strap ground cord, 10'
  - Instruction sheet



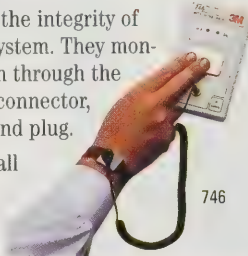
P/N	Description	1-3	4+
8507	Field-service kit with 725 wrist-strap monitor	\$130.25	\$122.00



### 3M Wrist-Strap Testers

The 745 and 746 check the integrity of the entire wrist-strap system. They monitor the conductive path through the user's wristband, snap connector, built-in resistor, cord, and plug.

- Can be mounted on wall
- Small enough to fit in service kit • NIST certified version available

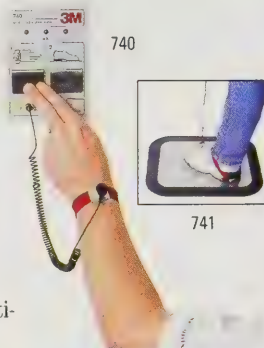


P/N	Description	1-4	5+
745	Wrist-strap tester (battery powered)	\$218.70	\$208.00
745-Certified	Wrist-strap tester, certified	341.70	318.75
746	Wrist-strap tester (AC powered)	300.70	286.00
746-Certified	Wrist-strap tester, certified	413.30	395.25

### 3M 740 Wrist-Strap and Footwear Tester

Four different resistance levels can be selected on this tester. A green LED lights when "OK" and a red LED lights when a selected resistance range is exceeded. The tester is comprised of 2 measurement circuits with an open test voltage of 20 V.

- Simple to use
- Mounts on wall
- Microprocessor-controlled • NIST certified version available

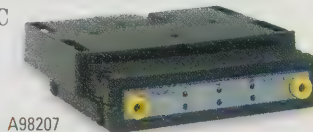


P/N	Description	1-4	5+
740	Wrist-strap and footwear tester	\$396.40	\$375.70
740-Certified	Wrist-strap and footwear tester	519.40	492.25
741	Shoe electrode	102.45	97.65

### DESCO Dual-Operator Constant Workstation Monitor

This unit continuously monitors the grounding integrity of 2 operators and an ESD protective-work-surface's discharge path to the ground.

- Provides instantaneous notification of static-control failures, eliminating the need of costly record keeping • (2) Remote jacks included
- Visual and audible alarms • Operator range: 500 k $\Omega$ –35 M $\Omega$  • Work-surface: 500 M $\Omega$ , 120 V AC

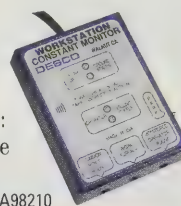


P/N	Description	Each
A98207	Dual-operator constant workstation monitor	\$150.00
A98201	Remote jack	20.40

### DESCO Workstation Constant Monitor

This workstation constant monitor continuously monitors both the operator and the work surface. It provides constant monitoring of an operator wearing a wrist strap and also functions to ensure the grounding integrity of ESD-safe work surfaces. This device will continuously monitor the user until the wrist strap or the cord fails, at which point the monitor will issue an audible signal notifying the user of a problem. When plugged in, the unit automatically runs a self-test. If the outlet is wired incorrectly, both red LEDs turn on and the alarm sounds.

- Monitors standard coil cord and wrist straps
- Monitors the work surface • Connects to utility ground when you plug it in so it is always on • Tests the entire circuit including the connection to the skin
- No batteries • Operator range: 500 k $\Omega$  to 35 M $\Omega$  • Work-surface range: 500 M $\Omega$



P/N	Description	Each
A98210	Workstation constant monitor	\$137.25

### DESCO Wrist-Strap Tester

An economical tester that provides a common ground point for a bench mat. The .395" (10-mm) stud on the back of the unit can be snapped directly onto a grounded outlet. Two users can plug standard wrist straps into the jacks on the unit to be grounded at the same potential as the mat. Users can periodically test their ground connection by simply touching the metal plate on the face of the unit. An audible signal indicates a good connection, so that users need not look away from their work to test their wrist straps.



P/N	Description	1-4	5-9	10+
A98150	Wrist-strap tester	\$66.25	\$61.20	\$55.50

### RICHMOND Wrist- and Heel-Strap Test Station

The OMEGA-CHECK wrist- and heel-strap tester system comes with an audible tone indicator that indicates a "pass," and a visible signal that indicates a high or low "fail." The wrist-strap tester may be handheld or wall mounted with the back plate. Heel- and toe-ground testing requires a foot plate.

- Compatible with all wrist and heel straps
- Highly reliable with simple user instructions • 750 k $\Omega$ –10 M $\Omega$  tester (U.S. Standard)

TSC



P/N	Description	1-4	5+
TSC	Wrist-/heel-strap test station	\$225.60	\$206.35

### CHARLESWATER Wrist-Strap, Heel-Ground Combo Tester

This is a simple-to-operate, single-station test fixture for wrist straps and footwear.

- Easy to operate and interpret • Wrist-strap "pass" range set at 750 k $\Omega$ –10 M $\Omega$  • Footwear "pass" range set at 750 k $\Omega$ –100 M $\Omega$  • 9-V alkaline battery included



P/N	Description	1-4	5+
19252	Combo tester	\$225.00	\$210.00

### CHARLESWATER Calibration Unit

This unit simplifies the process of calibrating wrist-strap and foot-ground test equipment. It is made with industry-accepted test ranges.

- Passive device, requires no power source
- Wrist-strap pass range set at 750 k $\Omega$ –10 M $\Omega$
- Foot-ground test range set at 750 k $\Omega$ –100 M $\Omega$
- Calibrated to NIST traceable standards

P/N	Description	1-4	5+
10176	Calibration unit and 2 test leads(12')	\$79.15	\$71.80

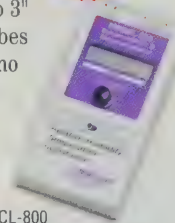
### ACL STATICIDE® 800 Megohmmeter

#### The World's Best Resistivity Meter

Measures Resistivity/Resistance, Temperature, and Humidity—"Humidity and temperature affect resistivity so they must be measured."

The Model 800 megohmmeter is designed to test all conductive, antistatic, and static-dissipative surfaces for electrical resistivity/resistance according to EOS/ESD, CECC, ANSI, ASTM, and UL test procedures. The meter also measures relative humidity and temperature, both of which affect electrical properties.

- Easy to use, high quality, dependable • Measures resistivity (10<sup>3</sup>–10<sup>12</sup>  $\Omega$ /sq.) • Measures resistance (10<sup>3</sup>–10<sup>12</sup>  $\Omega$ ) • Measures relative humidity (10%–90% RH) • Measures temperature (32 °F–100 °F) • 10-V/100-V test voltage range • Included probes: two 5-lb 2.5" RTT, RTG disk probes; two 3" parallel surface-resistivity probes
- LCD alpha-numeric scale—no LEDs • Rechargeable-battery capability • Tests mats, floor finishes, paints, wrist straps, smocks, foot wear, bags, and containers



ACL-800

P/N	Description	Each
ACL-800	Model 800 megohmmeter	\$995.00



## CHARLESWATER Digital Work-Surface Tester Kit

This kit provides everything you need to test a work surface using the procedure outlined in EOS/ESD-S4.1. The megohmmeter is lightweight, portable, and battery operated—allowing for complete freedom of use. The meter's large digits are very easy to read, even in dim light. Two 5-lb weights are provided for consistent and repeatable contacts with the surface under test. Surface resistivity testing is easy—just place the weights, attach the cables, switch to the correct voltage, and press the button to read resistance directly on the meter—no interpretation or calculation is required.

- Complete kit includes everything needed for testing
- Battery operation permits testing virtually anywhere
- 2 test voltages (switchable from 10 V DC to 100 V DC)
- Resistance ranges from 103  $\Omega$  to 1012  $\Omega$
- Rugged carrying case included
- LCD
- NIST traceable
- Rechargeable battery



P/N	Description	1	2+
19770	Surface resistance/resistivity test kit	\$809.55	\$733.25

## CHARLESWATER Personal Ground Tester

This tester offers 3 test configurations. When installed at a static-safe workstation, it checks the safety and proper connection of the wrist strap and coiled cord while on the operator's wrist. It also tests the wrist-strap and coiled-cord components. An optional foot plate allows testing of heel straps and conductive footwear. The tester is powered by a rechargeable battery and is supplied complete with a detachable 120-V power supply. Test parameters are factory set at 750 K $\Omega$ –10 M $\Omega$  but can be adjusted by the user if desired.

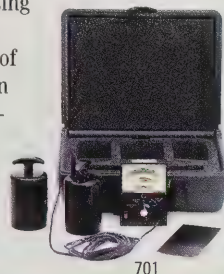
- NIST traceable



P/N	Description	1-4	5+
19310	Personal tester with 120-V charger	\$258.95	\$225.00
19335	Foot plate for tester	62.15	44.60
19256	AC adapter, 120 V	13.90	12.15

## 3M Surface Test Kit

The 701 test kit contains a lightweight, user-friendly megohm meter plus all the necessary components to make testing mats and other surfaces simple and accurate. All of the items are packaged in a handy foam-lined carrying case. The kit measures charge-draining efficiency of all static-control surfacing products.

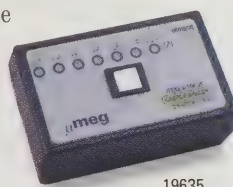


P/N	Description	1-4	5-9	10+
701	Test kit	\$641.05	\$637.85	\$613.30
701-Certified	Test kit	764.05	760.25	731.00

## CHARLESWATER Micro Meg Pocket Surface-Resistivity Meter

The compact size of this unit allows for maximum portability, making it perfect for quality control, field service, and the auditing of your ESD program. It's ideal for fast and accurate electrical measurements of dissipative and conductive surfaces. The quick measurement provided by this instrument shows the electrical range in a simple-to-read display. The 19635 is supplied with a 9-V battery and 3 gold-plated electrode sensors that are used to make contact with surfaces—and allow for reliable testing of different surfaces.

- 9-V battery
- Pocket-size resistivity tester
- Tests both surface and surface-to-ground resistance
- A lead for resistance-to-ground testing is included
- Range: 10<sup>3</sup>–10<sup>10</sup>
- Size: 4" x 2.5" x 1.75"



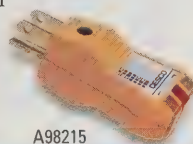
P/N	Description	1-4	5+
19635	Micro meg meter	\$252.25	\$235.00

## DESCO Polarity Ground Checker and Ground Point

The polarity ground checker is an easy-to-use hand-held test instrument that is designed to verify the wiring of an electrical outlet. Many industry standards recommend wiring ESD grounding equipment to the center screw of a standard electrical outlet. Testing the outlet is recommended to ensure that the screw is properly grounded.

When the unit is plugged into an outlet, its 3 neon lights indicate the "hot", "neutral", and "ground" lines. The sequence of lights indicates whether or not the outlet is wired properly.

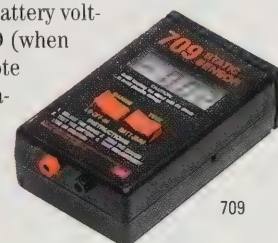
The polarity ground checker also incorporates a banana jack that accepts a standard DESCO banana plug, allowing for grounding of an operator through the unit.



P/N	Description	Each
A98215	Polarity and ground checker	\$25.50

## 3M Static Sensor

The 3M 709 static sensor is an accurate, hand-held, lightweight unit designed to measure static voltages on objects and surfaces. The 709 features a digital LCD and 2 range settings: "LOW" to measure up to 1,990 V and "HIGH" to measure up to 19,900 V. The sensor comes with 1 standard 9-V transistor battery and has a battery-test circuit which displays the battery voltage level on the LCD (when activated). For remote monitoring or permanent recording, the 709 provides 2 pin-type output jacks.



P/N	Description	1-4	5-9	10+
709	Static sensor	\$497.00	\$494.50	\$475.50
709-Certified	Static sensor	620.00	616.90	578.35

## ACL Electrostatic Locator

- Measures static charges from 0 V to 30,000 V
- Convenient, fits in your pocket
- Uses standard 9-V battery



P/N	Description	1-4	5+
ACL-300B	Static meter	\$380.00	\$326.10
CS13	Carrying case for ACL-300B	23.75	20.45

## DESCO Hand-Held Static Field Meter

The DESCO A50015 is a high-quality, portable, noncontacting static field meter which produces consistently accurate readings with ease and trouble-free operation. It reads surface voltage and polarity on objects up to  $\pm 20$  kV at a spacing of 1" with an accuracy of 5% of the displayed value. It is chopper-stabilized for use under almost any conditions including ionized environments.

A unique flashing-LED rangefinder system provides accurate positioning of the meter from the target. Additional functions include: push-button auto-zero and push-button hold.

- Carrying case and 9-V battery included



P/N	Description	Each
A50015	Static field meter	\$503.45



## From the bench

### IONIZATION

Courtesy of SIMCO/Richmond

Air ionization produces a neutral static charge. It is employed in electrostatically protected areas (EPAs) and in areas requiring contamination control. Neutralizing static charges on objects and surfaces reduces the risk of ESD events and the attraction of airborne particles. Furthermore, ionization significantly reduces the level to which objects and surfaces can be recharged.

Ionizers are the only effective means of neutralizing static charges on insulated and nongrounded conductive materials. Ionizers produce both positive and negative ions by either adding or removing electrons from molecules in the air. By adding electrons, the remaining airborne molecules become negatively charged. By removing electrons, the remaining airborne molecules become positively charged. Electrostatically-charged objects and surfaces then attract the opposite-polarity airborne ions and become electrostatically neutral. Airborne ions can be allowed to naturally attract to charged surfaces in the vicinity of an ionizer, or they can be propelled toward desired areas by fans, or pulled by air currents—as with a HEPA filter.

Ionizers can be used on bench tops, suspended overhead, or incorporated into compressed air guns. They can be used over processing equipment such as wave-soldering machines (at entrances and exits), over conveyors, as bar ionizers attached to HEPA filters on laminar air flow cleaned work stations, and inside automatic pick and place or handling equipment. When using ionizers, special care should be taken to: (1) use only those that produce a balanced population of positive and negative air ions, (2) use only those that meet the static-decay time and level requirements of the targeted area.

### CHARLESWATER ION PUMP

The ION PUMP utilizes the unique Faraday balance system, which allows the unit to automatically maintain a balanced ion output even in the most extreme environments. It's been designed to emit ions in a true laminar flow, which effectively reduces ion recombination, emitter contamination, and gives superior performance in neutralizing static charges at greater distances.

- Excellent static decay • Auto balancing
- Efficient laminar flow ion output • Safe non-nuclear operation • Gold-plated emitters
- Fixed-temperature heater
- Replaceable air filter
- Swivel base



19500

P/N	Description	1-2	3+
19500	120-V ION PUMP	\$448.75	\$422.00

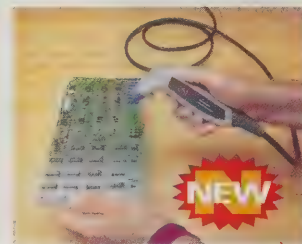
### 3M Ionized-Air Gun

The 3M ionized-air gun is an excellent tool for blowing particulate contamination off any surface, even from the most static-sensitive products. It releases a constantly balanced stream of compressed ionized air or gas that neutralizes static charges that attract particulates to surfaces. A charge of 1,000 V is reduced to less than 100 V in less than a second. The loose particulates can then be easily blown away.

The unique ionization system used in the Model 980 is completely self-balancing—no adjustment or calibration is needed. It maintains the balance to within  $\pm 30$  V of 0 V (at a distance of 6"). The unit is virtually maintenance free—all that is required is occasional cleaning of the housing and emitter points. The Model 980 is designed to be the most lightweight, comfortable, and easy-to-use ionizing air gun available.

- Source power (to transformer): 120 V AC, 50 Hz/60 Hz, 32 W
- Output power (from transformer): 24 V AC, 1.0 A, <10 W
- Ion output: steady-state DC

980



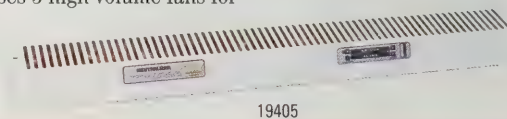
P/N	Description	Each
980	Ionized-air gun, 120 V	\$748.50
980-X	Wall transformer, 120 V	36.25
980-F	Air filter (pack of 3)	82.50
980-T	Emitter points (pair)	27.50
980-S	Foot switch	75.00

### CHARLESWATER Overhead Ionizer

The CHARLESWATER overhead ionizer line includes 2 models uniquely designed to suit your needs. The 19490 NEUTRALIZER PLUS mounts over your workbench to save you valuable work space. The overhead design allows for a more consistent coverage pattern and it eliminates shadow areas that cause operator discomfort. It incorporates auto balancing/auto shutdown circuitry along with soft touch controls, a visual balance indicator, internal emitters, and an operator lock-out key.

The 19405 is a deluxe overhead ionizer that uses 3 high-volume fans for rapid decay of static charges.

- Overhead design provides more consistent and wider coverage • Overall length: 40"
- NIST traceable



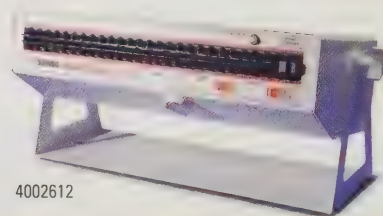
19405

P/N	Description	1-2	3+
19490	NEUTRALIZER PLUS ionizer, NIST	\$717.10	\$671.00
19405	Deluxe high-output ionizer, NIST	846.90	763.75
19403	Light for ionizer, retrofit only	66.30	60.00

### SIMCO AEROSTAT® XC Ionizing Air Blower

The AEROSTAT XC provides extended coverage, stability of balance, and rapid static-charge decay for a variety of environments, including clean rooms. It comes with a bench-top stand or optional pedestal mount—it can also be mounted on a wall or overhead shelf. Also included is SIMCO's patented emitter-point cleaner, a 3-speed fan, and an internal heater for user comfort.

- Rapid static-charge decay • Inherently balanced to  $\pm 5$  V to protect ESD-sensitive components
- Status light indicates the presence of ionization



4002612

P/N	Description	1-2	3+
4002612	AEROSTAT XC	\$494.00	\$461.10

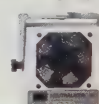
### CHARLESWATER NEUTRALIZER JR. Ionizer and Mounting Arm

This is a compact, auto balancing, bench-top ionizer. Its unique active feedback balance circuit automatically maintains the ion balance.

- Compact and lightweight • Visual alarm goes on when maintenance is required • Can be on a bench or shelf, or wall-mounted • Most efficient from 6"—42" in front of unit • NIST traceable

#### Mounting Arm

- Designed to be used with the NEUTRALIZER JR.
- Includes an installed three-prong power cord
- Hinged-arm assembly allows user to focus the ionizer's output directly on sensitive areas
- Extends to 40" • Weight capacity: 3 lb—4 lb



19557

P/N	Description	Each
19557	NEUTRALIZER JR. ionizing unit, NIST	\$327.80
19559	Ionizer mounting arm	96.90



## SIMCO TOP GUN™ Ionizing Gun

SIMCO's new TOP GUN is a high-performance ionizing air gun designed for electronics and clean-room applications. Balanced to 0 V  $\pm 20$  V, the new TOP GUN features a high blow-off force and low air consumption to provide high-efficiency cleaning and maximum static-charge decay. A filter at the exit of the gun ensures that the air is clean.

The gun body is lightweight but durable. It features a light-touch trigger, making it comfortable even for extended use. All functions are built into the handpiece, including a flow-control valve, balance adjustment for calibration, and 2-level LED which indicates both power and ionization. Both the gun and cable are static dissipative. A hanger is provided for easy mounting.

- Lightweight gun with ergonomic design for operator comfort
- Flow-control valve for application-specific airflow adjustment
- Indicator light verifies presence of ionization



4005105

P/N	Description	1	2-4	5+
4005105	TOP GUN ionizing gun	\$675.00	\$630.00	\$590.65

## CHARLESWATER Neutralizing Ion Vector and Hand Gun

These ready-to-use units are designed for use in applications and areas where static can create manufacturing or handling problems. They quickly and effectively neutralize bulk static charges and aid in controlling contamination by dislodging dust and debris attracted by static electricity. The air flow may be easily adjusted from a gentle stream to a powerful blast. The 19585 ion vector is designed for point-of-use fixed-mounting applications, while the 19587 hand gun is for portable use. The air hoses of both units are designed to be easily disconnected or replaced.

- 19585 ion vector includes: controller, ion-vector attachment, and foot switch
- 19587 hand gun includes: controller and hand-gun attachment
- Ion vector and hand gun must always be used with filtered, dry noncombustible gases, such as compressed shop air or nitrogen
- Neutralizing ion vector and hand gun may be operated over a range of 5 psi to 100 psi • 120 V AC, 50 Hz/60 Hz



19585

P/N	Description	1	2-4	5+
19585	Ion vector system	\$740.40	\$685.00	\$638.00
19587	Neutralizing hand-gun system	688.00	639.00	597.00
19591	Replacement nozzle/air-hose assembly for ion vector	161.50	147.00	137.00
19594	Replacement nozzle/air-hose assembly for hand gun	147.45	134.85	125.00

## 3M Ionized-Air Blowers

3M ionizers are self-contained, bipolar, and intrinsically balanced. They have a proprietary self-balancing system which ensures that equal levels of positive and negative ions are produced.

- No adjustment or calibration required
- Variable speed
- Maintenance-free
- Quiet
- Compact
- 961 has a built-in heater



961

P/N	Description	1-4	5+
961	2-speed (low, high)	\$408.70	\$382.00
962	3-speed (low, med, high)	545.35	508.75

## 3M Air Ionizer Tester/Charger

This is a compact electrostatic field meter that can be conveniently used for locating and measuring static charge voltages. In combination with an isolated plate test fixture and the 713 CH charger, this versatile handheld meter can also be used to test the function and balance of air ionizers on site—without having to carry a larger charged plate monitor.

The Model 713-Certified is calibrated and certified to NIST traceable standards.

- Compact size
- Lightweight case
- "Chopper" field sensor
- Conductive case and snap fastener
- 1-year warranty



713CH

713

P/N	Description	1	2+
713	Air-ionizer tester/field meter	\$594.30	\$554.40
713-Certified	Air-ionizer tester/field meter	717.30	669.25
713CH	Charger for air ionizer	209.00	183.35

## SIMCO AEROSTAT® PC™ Personal Ionizing Air Blower

This product provides superior static-charge decay rates over a targeted work-surface area. The AEROSTAT PC is easy to position, small, quiet, lightweight, and uncompromising in performance. It is designed to provide optimum protection from the destructive effects of ESD and to prevent contaminants from being attracted to surfaces.

The AEROSTAT PC is balanced to 0  $\pm 5$  V, which ensures that even the most sensitive components are protected from ESD damage.

- Variable-speed fan and integrated heater allow personalized control of airflow and temperature



4003367

P/N	Description	1	2-4	5+
4003367	AEROSTAT PC	\$439.00	\$409.75	\$384.15

## SIMCO PULSEGUN 5 Ionizing Gun

This is a compact, lightweight, hand-held ionizing gun. Designed for a wide range of applications, especially in manufacturing and assembly areas where constant usage is required. The PULSEGUN 5 connects to the AIRFLOW CONTROLLER. It gives you total control of the ion balance with independent voltage level controls and pulse or steady-state DC indicator lights



4005186

4005149

P/N	Description	1	2-4	5+
4005149	PULSEGUN 5, ionizing blow-off gun	\$250.00	\$233.35	\$218.75
4005186	AIRFLOW CONTROLLER	310.00	290.00	270.65

## ACL Floor Finish Constant Resistance Monitor

The ACL-775 is the industry's first constant resistance floor monitor designed to test whether a floor finish or floor paint is properly functioning. It can be used with all static-dissipative floor finishes or paints. The acceptable resistance test range is between  $10^7 \Omega$  and  $10^{10} \Omega$ —ideal for ISO 9000 conformance. Coatings outside of this range cause the monitor to buzz and flash a red LED. The monitor comes complete with a UL-CE Listed 110 V power supply and 2 tape electrodes.

- Tests all brands of ESD paints and waxes
- Eliminates daily spot testing



ACL-775

P/N	Description	Each
ACL-775	Floor finish constant resistance monitor	\$228.00



### 3M Adjustable Elastic Wrist Straps

Ensure a comfortable custom fit with these adjustable wrist straps. One size adjusts to any size wrist to provide reliable 360° protection. Their "adjustability" simplifies ordering procedures and inventory control by eliminating the need to order and stock several sizes of bands.

- UL Listed



P/N	Description	1-9	10-24	25+
2214	Wrist-strap assembly with 5' coil cord	\$24.20	\$22.75	\$21.25
2224	Wrist-strap assembly with 10' coil cord	30.10	28.30	26.40
2244	Wrist-strap assembly with 5' light, heavy-duty coil cord	25.45	23.90	22.35
2204	Replacement band only	10.00	9.35	8.75

### 3M Fixed-Size Elastic Wrist Straps

These wrist straps dissipate static from personnel before it can damage devices being handled. They feature a band made of silver-plated, monofilament, continuous thread woven together with elastic nylon to assure full conductivity, comfort, and reliability.

- Provide rapid and continuous drain of static charge
- 1-MΩ resistor built into cord

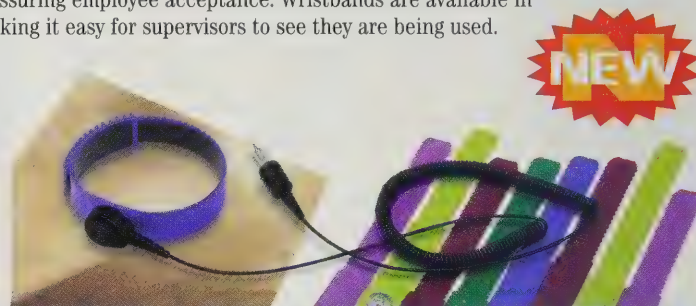
P/N	Description	1-9	10-24	25+
2211	Small wrist strap with 5' coil cord	\$20.60	\$19.35	\$18.05
2212	Medium wrist strap with 5' coil cord	20.60	19.35	18.05
2213	Large wrist strap with 5' coil cord	20.60	19.35	18.05
2221	Small wrist strap with 10' coil cord	24.80	23.30	21.75
2222	Medium wrist strap with 10' coil cord	24.80	23.30	21.75
2223	Large wrist strap with 10' coil cord	24.80	23.30	21.75
2201	Small replacement bands	8.15	7.65	7.15
2202	Medium replacement bands	8.15	7.65	7.15
2203	Large replacement bands	8.15	7.65	7.15
2210	Replacement 5' coil cord	16.55	15.55	14.50
2220	Replacement 10' coil cord	20.10	18.85	17.60
2240	Replacement 5' lightweight, heavy-duty coil cord	17.65	16.60	15.50
2243	Replacement 5' extension ground cord	17.85	16.75	15.65

### 3M 4600 Series Wristbands, Cords, and Wrist Straps

3M introduces the 4600 Series wristband as another member of the 3M static-control product line to help businesses cut costs. The band has a molded insulative thermoplastic colored exterior, an integrally molded conductive interior insert, and a metal male snap. It is lightweight, low-profile, and safely makes contact with human skin—assuring employee acceptance. Wristbands are available in a variety of bright colors, making it easy for supervisors to see they are being used.

They contain highly flexible tinsel conductors laced into high-strength, energy-absorbing synthetic fibers, housed within a lightweight, coiled, engineering-grade thermoplastic insulative jacket.

- 1 size fits all

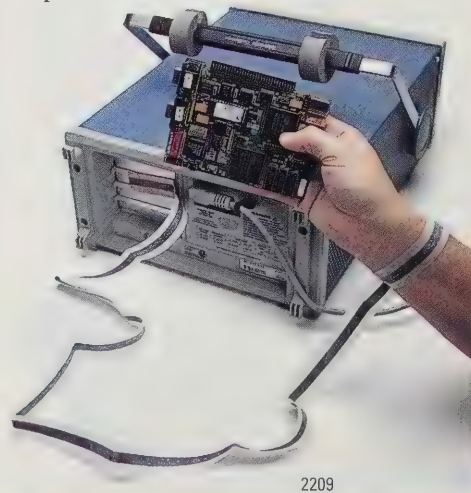


P/N	Description	1-9	10-24	25+
4650	Wrist strap with 5' ground assembly, blue	\$6.85	\$6.45	\$6.00
4651	Wrist strap with 5' ground assembly, green	6.85	6.45	6.00
4652	Wrist strap with 5' ground assembly, purple	6.85	6.45	6.00
4653	Wrist strap with 5' ground assembly, maroon	6.85	6.45	6.00
4654	Wrist strap with 5' ground assembly, lime	6.85	6.45	6.00
4620	Wristband only with 4-mm stud, blue	1.90	1.80	1.65
4621	Wristband only with 4-mm stud, green	1.90	1.80	1.65
4622	Wristband only with 4-mm stud, purple	1.90	1.80	1.65
4623	Wristband only with 4-mm stud, maroon	1.90	1.80	1.65
4624	Wristband only with 4-mm stud, lime	1.90	1.80	1.65
4610	Lightweight coiled cord, 5', with 4-mm snap	4.95	4.65	4.35
4611	Lightweight coiled cord, 10', with 4-mm snap	5.85	5.50	5.15

P/N	Description	Carton
4659	Wrist strap with 5' ground assembly, mixed colors (5 of each color in carton)	\$171.00
4629	Wristband only with 4-mm stud, mixed colors (5 of each color in carton)	47.50

### 3M Disposable Wrist Strap

The 3M 2209 disposable wrist strap provides reliable static protection for about a dollar. The wrist strap is ideally suited for shipping with components to ensure protection at the receiving end, or in the plant for short-term use with visitors and others who don't need the durability of a reusable strap.

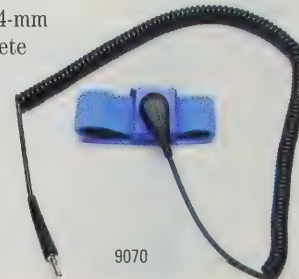


P/N	Description	1-499	500-999	1000+
2209	Disposable wrist strap	\$1.05	\$1.00	\$0.95

### DESCO Adjustable Wrist Strap

- Elastic material: extra wide and soft for wearer comfort, easy to replace without tools, silver-impregnated nylon knitted to the inside for superior conductivity
- Adjustable: may be fitted to any size, the material does not slip once the strap is adjusted and locked
- Unique patented adjustment design: eliminates exposed conductive "tail"—for added safety
- Long-lasting stainless-steel stud
- Nonallergenic stainless steel
- No sloughing: safe for micro electronics
- Circumference: 2.5" min., 13" max.
- UL Listed for added safety
- Date-coded

All bands have a 4-mm snap stud. Complete wrist-strap kits with coil cords include an alligator clip.



P/N	Description	1-9	10-24	25+
9070	Band with 6' cord	\$15.25	\$13.55	\$12.65
9069	Band with 12' cord	15.85	13.90	13.00
9028	Band only	6.00	5.30	4.95



Products with this symbol are some of our most popular and best priced.



New Product: This symbol represents the industry's latest offerings.



## CHARLESWATER Elastic Wrist Straps

These elastic wrist straps feature 4-mm solid snap studs for electrical reliability—all are UL Listed and date coded.

The adjustable elastic wristbands feature a hinge-lock adjustment, plus the following features:

- Extra band material to allow user to custom-fit the size
- Band can be readjusted several times for correct fit
- Only nonallergenic stainless steel and polyester fabric with silver thread touch the skin
- Electrical continuity to ground is maintained even if the buckle is open
- Durable, lightweight fabric for softness and flexibility



### Wristband Circumferences

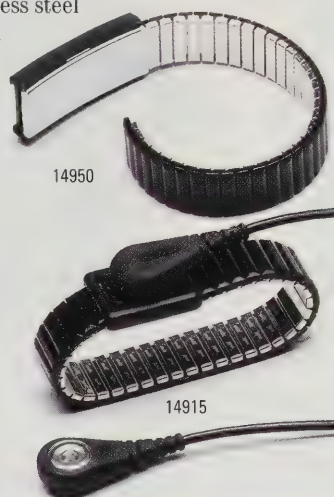
	Min.	Max.	Width
Small	5.0"	9"	.75"
Medium	6.0"	11"	.75"
Large	6.5"	12"	.75"

P/N	Description	1-9	10-24	25+
<b>Adjustable-Size Bands</b>				
14810	Band with 6' coil cord	\$15.25	\$14.00	\$12.45
14830	Band with 10' coil cord	16.50	15.50	13.45
14840	Band only, blue	6.00	5.65	4.90
14841	Band only, neon green	6.00	5.65	4.90
<b>Fixed-Size Bands</b>				
14730	Band with 6' cord, small	14.90	13.70	11.90
14720	Band with 6' cord, medium	14.90	13.70	11.90
14710	Band with 6' cord, large	14.90	13.70	11.90
14790	Band only, small	6.15	5.65	4.90
14780	Band only, medium	6.15	5.65	4.90
14770	Band only, large	6.15	5.65	4.90

## CHARLESWATER Metal Wrist Straps

The SPEIDEL® TWIST-O-FLEX® metal expansion wristband is known for its dependability and design—which does not pinch or pull hair.

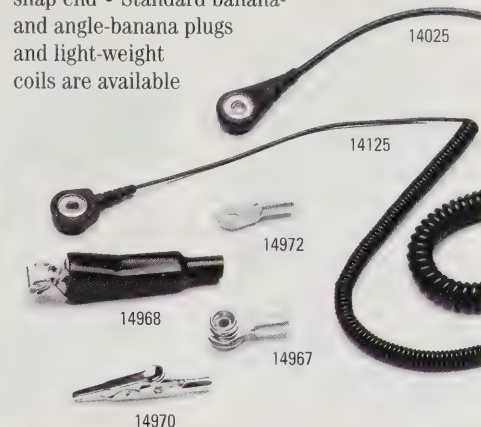
- Available in adjustable or fixed sizes
- All nonallergenic stainless steel
- Insulated on all outside surfaces
- UL Listed
- Alligator clip sold separately



P/N	Description	1-9	10-24	25+
<b>Adjustable-Size Bands</b>				
14905	Band with 6' coil cord	\$23.95	\$22.45	\$19.45
14922	Band with 10' coil cord	25.50	23.75	20.60
<b>Adjustable Band Only</b>				
14950	5.5" min., 7" max., 13" expanded	15.95	15.00	13.00
14955	6.5" min., 8" max., 14" expanded	17.45	16.40	14.20
<b>Fixed-Size Bands</b>				
14910	Band with 6' cord, small	25.50	23.75	20.60
14915	Band with 6' cord, medium	25.50	23.75	20.60
14920	Band with 6' cord, large	25.50	23.75	20.60
14935	Wristband only, small	18.45	17.30	15.00
14940	Wristband only, medium	18.45	17.30	15.00
14945	Wristband only, large	18.45	17.30	15.00

## CHARLESWATER Cords and Hardware

- All cords feature one-megohm-series resistor at snap end
- Standard banana- and angle-banana plugs and light-weight coils are available



P/N	Description	1-9	10-24	25+
<b>Ground Cords</b>				
14010	6', beige	\$10.40	\$9.45	\$9.00
14025	6', black	10.40	9.80	8.60
14110	10', beige	12.40	11.70	10.85
14125	10', black	12.40	11.70	10.85
<b>Ground Cords with Angle Banana Jack</b>				
20095	6', black	9.90	9.30	8.05
20100	10', black	11.85	11.10	9.65
<b>Lightweight Cord</b>				
14035	5', black	11.90	10.95	9.50
<b>Grounding Hardware</b>				
14967	Stacking-snap banana jack: It provides a banana jack anywhere you have either a 10-mm snap stud (male) or a 10-mm snap socket (female).	1.60	1.50	1.30
14968	Large clip with banana jack	3.95	3.70	3.20
14970	Alligator clip	.70	.65	.60
14972	Ring-terminal banana jack	1.05	.95	.85

## CHARLESWATER Heel Straps

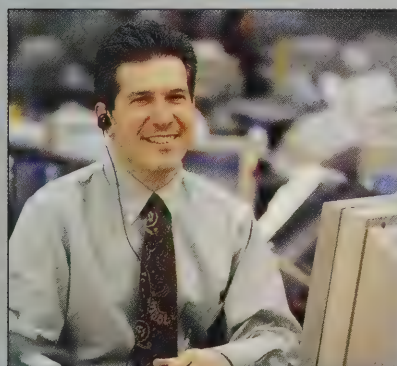
Foot grounders are necessary for mobile personnel where wrist straps are not practical.

- Heel- and toe-ground styles are available
- Avail-

able with or without 1-MΩ-series resistor (except disposables) • Disposable style also available • Non-marking style will not mark shoes or floors • Must be used with properly grounded floors • Use on both feet for proper grounding



P/N	Description	1-9	10-24	25+
17200	Reusable heel with resistor ground	\$7.35	\$6.75	\$5.95
17210	Reusable heel ground without resistor	7.35	6.75	5.95
17250	Nonmarking reusable heel ground	9.55	8.85	7.75
17222	Reusable toe ground with resistor	11.20	10.30	8.95
17232	Reusable toe ground without resistor	11.20	10.30	8.95
17100	12" disposable heel ground (box, 100)	32.25	29.50	26.25
17150	20" disposable boot ground (box, 100)	44.75	40.80	36.40



We're Here to Help You with Your Questions.



### 3M Shoe- and Toe-Grounding Assemblies

These long-lasting shoe-grounding assemblies effectively ground personnel when they are in contact with conductive flooring. To be effective, the shoe and toe grounders must be worn on both feet.

NOTE: The 2051 and 2053 grounding assemblies are not to be used in areas where the individual may come in contact with electrical circuitry exceeding 250 V.

- 2051-M2 includes 2-M $\Omega$  resistor
- 2053 designed for use with high-heel shoes



P/N	Description	1-9	10-24	25+
2051	Shoe assembly, 1-M $\Omega$ resistor	\$9.85	\$9.25	\$8.65
2051-M2	Shoe assembly, 2-M $\Omega$ resistor	9.85	9.25	8.65
2053	Toe assembly, 1-M $\Omega$ resistor	10.80	10.15	9.50

### DESCO Premium Heel Grounder

The Premium Series heel grounders provide effective and economical ESD protection. The dual-layer cup is made from a black conductive layer and a light-blue lining that keeps carbon marks from getting on shoes. This unit includes either a 1-M $\Omega$  or 2-M $\Omega$  molded external resistor, conductive tab with carbon-suffused fibers, and a D-ring fastening system.

- Rubber heel cup provides a wider contact area
- Cup can be rotated when 1 band becomes worn, extending the life of the heel grounder
- Light-blue nonmarking interior



P/N	Description	1-9	10-24	25+
7590	Heel grounder, 1-M $\Omega$ resistor	\$10.15	\$8.65	\$8.10
7593	Heel grounder, 2-M $\Omega$ resistor	10.15	8.65	8.10

### DESCO Sole Grounder

This premium sole grounder provides a more complete path-to-ground than regular heel or toe grounders due to a wider and more consistent contact area. The rubber sole is made of a black conductive outer layer and a nonmarking lining that prevents carbon marks on shoes. The grounder includes a blue tab with carbon-suffused fibers and D-ring and snap-lock fastening systems.

- Tab-to-cup resistance:  $2 \times 10^6 \Omega$ – $1 \times 10^7 \Omega$
- Includes: 2-M $\Omega$  resistor
- 36" tab



P/N	Description	1-9	10-24	25+
7504	Large, men's 11–15	\$11.70	\$9.15	\$8.50
7505	Medium, women's 7–men's 10	11.70	9.15	8.50
7506	Small, women's 3–7	11.70	9.15	8.50

### BOTRON Wrist Straps

These adjustable wrist straps combine maximum comfort with safe, reliable discharge of static charges.

- Metal wrist straps are ideal for clean room
- Do not pinch
- Lightweight, durable cords



P/N	Description	1-9	10-24	25+
M-32110	Adjustable metal band, 6' coil cord	\$16.40	\$14.50	\$12.75
M-32115	Adjustable elastic band, 6' coil cord	8.20	7.50	6.00
M-32120	Metal adjustable band only	11.30	10.35	8.30
M-32122	Elastic adjustable band only	4.50	4.00	3.60
M-32124	6' coil cord only	5.50	5.10	4.35
M-32126	12' coil cord only	6.40	5.85	5.00

### BOTRON ERGO ONE Heel Grounders

These heel grounders are made with stretch VELCRO. It expands for maximum comfort, assures a proper fit, and has excellent static-decay properties.

- 1-1/2" conductive non-marking rubber
- Includes 1-M $\Omega$  resistor
- M-32310 has red elastic for high visibility



P/N	Description	1-9	10-24	25+
M-32300	Adjustable heel grounder	\$4.75	\$4.25	\$3.80
M-32310	Adjustable heel grounder, red elastic	5.20	4.60	4.10

### TECH STYLES HOT GLOVE®

The HOT GLOVE is designed to provide operator comfort and to dissipate static electricity when handling "hot" circuit boards and other hot, sensitive parts that are susceptible to breakdown. The palm insert is 100% MOMEMX™—to provide operator comfort when exposed to higher than normal temperatures. The HOT GLOVE is not recommended for use in open-flame or fire-fighting environments.

- 12 pair per package



P/N	Description	1-4	5+
GLESDN-*	Unisex HOT GLOVE	\$191.10	\$152.85

\*Specify small, medium, or large.

### CHARLESWATER Static-Dissipative Gloves

These static-dissipative gloves eliminate the need for wristbands. They can be grounded to a smock or wrist-strap ground cord.

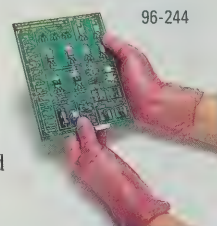
- 2-piece design for comfort
- Ambidextrous
- Textured polyester with conductive-fiber filament
- Safe for use in clean rooms down to Class 100
- Color-coded cuffs



P/N	Description	Pair
68100	Women's static-dissipative gloves, large, orange	\$6.40
68101	Women's static-dissipative gloves, medium, red	6.40
68102	Women's static-dissipative gloves, small, pink	6.40
68103	Men's static-dissipative gloves, large, brown	6.40
68104	Men's static-dissipative gloves, medium, blue	6.40
68105	Men's static-dissipative gloves, small, beige	6.40
68106	Men's static-dissipative gloves, extralarge, grey	6.40

### OAK Vinyl Gloves

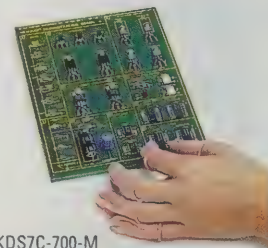
- Powder-free, antistatic, long-length, disposable vinyl gloves
- Developed to eliminate damage to delicate electronic components
- Provide maximum protection from static build-up and contamination
- Packaged 100 gloves to a zip-close bag



P/N	Description	1-4	5-9	10+
96-144	Antistatic, powder-free small vinyl gloves	\$20.70	\$19.10	\$17.75
96-244	Antistatic, powder-free medium vinyl gloves	20.70	19.10	17.75
96-344	Antistatic, powder-free large/x-large vinyl gloves	20.70	19.10	17.75

### KAHNETICS Finger Cots

- Static-free, powder-free finger cots
- Sold in 5-gross package
- Clean-room safe



P/N	Description	1-4	5-9	10+
KDS7C-700-S	Small finger cots	\$30.50	\$28.25	\$24.00
KDS7C-700-M	Medium finger cots	30.50	28.25	24.00
KDS7C-700-L	Large finger cots	30.50	28.25	24.00
KDS7C-700-XL	Extra-large finger cots	30.50	28.25	24.00



## TECH WEAR Garments

These garments are available in a variety of materials. The HOJ and the new HIJ jackets have raglan sleeves, stylish V-neck design, and TECH WEAR's exclusive ESD knit cuff. A ground cord attaches to the snaps on the hip pockets, grounding the operator and the garment—no more replacing lost or broken wrist straps. All garments meet the NATIONAL ESD ASSOCIATION STM2.1-1997 Standard for static-control garments.

### OFX-100 Material

- Lightweight (2.3 oz per sq yd), 87% poly, 13% BASF™ RESISTAT nylon • Available in jacket or coat • Color choices: high-tech blue or teal • Sizes: XS-XL • When properly laundered it maintains a sleeve-to-sleeve continuity of 10<sup>7</sup> or below for 1 year or 100 washings

### IVX-400 Material

- Medium weight, 4 oz per sq yd, 93% poly, 7% BASF RESISTAT nylon • Color choices: royal blue or white • Sizes: XS-XL • Available in jacket or coat • When properly laundered will maintain sleeve-to-sleeve continuity of 10<sup>7</sup> or below for 1 year or 100 washings

### ECX-500 Material

- ECONOSHIELD: lightweight (3.0 oz per sq. yd) • 98% poly, 2% BASF RESISTAT • Color choices: diamond blue or white • Sizes: XS-XL, 3/4-length • Designed for the economy-minded user of ESD garments

NOTE: TECH WEAR now identifies all of their static-control garments with the "reaching-hand" symbol—clearly visible on the front of the garment.



HIJ-43C



HOJ-83C



VOJ-23

P/N	Description	Color	Material	1-9	10-24	25+
VOJ-23	V-neck jacket	Blue	OFX-100	\$31.95	\$29.50	\$27.35
LOJ-23	Traditional jacket	Blue	OFX-100	33.35	30.80	28.60
LOC-23	Lab coat	Blue	OFX-100	36.70	33.85	31.45
HOJ-23C	V-neck jacket with cuff	Blue	OFX-100	41.70	38.50	35.75
HOJ-83C	V-neck jacket with cuff	Teal	OFX-100	43.35	40.00	37.15
HIJ-43C	V-neck jacket with cuff	Royal blue	IVX-400	43.35	40.00	37.15
LIC-13	Lab coat	White	IVX-400	38.10	35.15	32.65
LEQ-43	3/4 coat	Diamond-blue	ECX-500	25.00	23.10	21.45
LEQ-13	3/4 coat	White	ECX-500	25.00	23.10	21.45
M-32124	6' ground cord for HOJ and HIJ series garments			5.50	5.10	4.35

NOTE: C denotes ESD knit cuffs.

## GOLDEN NEEDLES ESD Gloves

Made of yarns that combine man-made fiber with NIHON SANMO's THUNDERON®, a fiber that exhibits exceptionally high electrical conductivity, these low-linting, electrostatic-dissipating gloves are ideal for use in applications where static electricity must be controlled.

- 12 pair per package



SAN-ESD-L

P/N	Description	Each
SAN-ESD-S	ESD gloves, small	\$35.00
SAN-ESD-M	ESD gloves, medium	35.00
SAN-ESD-L	ESD gloves, large	35.00

## GOLDEN NEEDLES ESD Gloves with Superb Cut Protection

These are electrostatic-dissipating, low-linting gloves made from THUNDERON fiber with a KEVLAR KLEEN™ aramid carrier that offers superb protection from cuts with minimum bulk. The fit of gloves made with KEVLAR KLEEN is close but not binding, hands can move easily, and tactile sensitivity is enhanced.

- 12 pair per package

P/N	Description	Each
KVK-ESD-S	ESD gloves, superb cut protection, sm.	\$52.00
KVK-ESD-M	ESD gloves, superb cut protection, med.	52.00
KVK-ESD-L	ESD gloves, superb cut protection, lg.	52.00

## ANGELICA Garments

These garments are designed to cover the personal clothing of workers at ESD-protected workstations. They are inherently static-dissipative, so no special laundering is needed to retain their static-control feature.

- STATGUARD: 80% polyester, 19% cotton blend, 1% carbonized nylon conductor in a grid pattern
- STATGUARD II: knit fabric composed of 98% continuous-filament polyester yarn and 2% continuous-filament carbonized nylon conductor in a grid pattern—STATGUARD II offers a choice when conductivity from sleeve cuff to sleeve cuff across all seams is needed



8161ACS



361ACQ



376FCS

P/N	Description	1-9	10-24	25+
376FCS	STATGUARD II royal-blue lab coat	\$24.75	\$22.85	\$21.20
376QCS	STATGUARD II white lab coat	24.75	22.85	21.20
371ACS	STATGUARD royal-blue lab coat	29.20	26.95	25.00
371ACQ	STATGUARD white lab coat	27.50	25.40	23.60
361ACS	STATGUARD royal-blue lapel coat	24.00	22.15	20.60
361ACQ	STATGUARD white lapel coat	24.00	22.15	20.60
8161ACS	STATGUARD royal-blue women's lapel coat	23.25	21.50	19.95



## From the bench

### WHY SO MANY MAT CHOICES?

#### 1-Layer Material (Homogeneous)

Low cost makes 1-layer vinyl a popular choice. It is durable and the roll stock is easy to cut to a desired size. It is typically in the dissipative range, and can be used on the table or floor. We carry **CHARLESWATER**, **DESCO**, **RICHMOND**, and **BOTRON**.

#### 2-Layer Material

Resistance to heat, abrasion, and solvents is why customers buy 2-layer rubber mats. This long-last-

ing material is ideal for soldering applications, but can also be used as a floor mat. We carry **3M**, **CHARLESWATER**, **DESCO**, and **BOTRON**.

#### 3-Layer Material

Excellent electrical properties are the key features of 3-layer vinyl mats. A highly conductive scrim sandwiched in the center of this mat allows a charge to dissipate rapidly. This mat can also be used on the table or floor and is typically in the dissipative range. We carry **3M**, **CHARLESWATER**, **DESCO**, and **BOTRON**.

#### Antifatigue Material

These thicker materials (typically 3/8") are designed to reduce human fatigue or to be used

where cushioning is required—and still provide adequate ESD protection. They are very long-lasting and are typically in the dissipative range. We carry **3M**, **CHARLESWATER**, **DESCO**, **BOTRON**, and **ERGOMAT**.

#### Conductive Material

Hard poly and flexible rubber materials can be found in the conductive range. They are low-cost, heat- and chemical-resistant, and easy to cut. See the individual product listing for its specific features. We carry **3M**, **CHARLESWATER**, and **DESCO**.

NOTE: Products of manufacturers that are in **BOLD** are featured in this catalog. Call us for information on other materials.

### BOTRON Solid-Vinyl Table Mats

This lay-flat, tabletop mat is made of a solid polymer mix that provides a durable ESD-safe work surface.

- Mats available in 5 standard sizes, complete with snap and 10' ground cord
- Rolls available in 4 standard widths
- Available in three colors: blue, brown, and putty
- Standard thickness: .093" (3/32")
- Surface resistivity: <10<sup>8</sup> Ω/sq

#### Table Mat with Snap and Ground Cord

P/N	Description	1-10	11-20	21+
M-35010	2' x 3', blue	\$33.70	\$31.05	\$28.85
M-35012	2' x 4', blue	45.80	42.30	39.25
M-35014	2' x 5', blue	50.75	46.85	43.50
M-35016	2' x 6', blue	62.70	57.80	53.70
M-35018	30" x 48", blue	54.50	52.30	46.70
M-35020	2' x 3', brown	33.70	31.05	28.85
M-35022	2' x 4', brown	45.80	42.30	39.25
M-35024	2' x 5', brown	50.75	46.85	43.50
M-35026	2' x 6', brown	62.70	57.80	53.70
M-35028	30" x 48", brown	54.50	52.30	46.70
M-35030	2' x 3', putty	33.70	31.05	28.85
M-35032	2' x 4', putty	45.80	42.30	39.25
M-35034	2' x 5', putty	50.75	46.85	43.50
M-35036	2' x 6', putty	62.70	57.80	53.70
M-35038	30" x 48", putty	54.50	52.30	46.70

#### Table-Mat Roll Stock

P/N	Description	1-3	4+
M-35050	2' x 50', blue	\$308.35	\$264.30
M-35052	30" x 50', blue	375.00	321.45
M-35054	3' x 50', blue	483.40	414.30
M-35056	4' x 50', blue	625.00	535.75
M-35060	2' x 50', brown	308.35	264.30
M-35062	30" x 50', brown	375.00	321.45
M-35066	4' x 50', brown	625.00	535.75
M-35070	2' x 50', putty	308.35	264.30
M-35072	30" x 50', putty	375.00	321.45
M-35076	4' x 50', putty	625.00	535.75

### BOTRON CLEAN STAT<sup>2</sup> Rubber Table Mats

The heat-resistant, 2-layer CLEAN STAT<sup>2</sup> rubber table mats meet EOS/ESD and DOD standards with an RTT and RTG resistance of <10<sup>8</sup>. They decay a charge from 5 kV to zero in less than 0.1 s.

- Chemical- and flux-resistant
- Not damaged by soldering irons
- Each mat includes 10' common-point ground cord • .060" thick
- Available in blue or grey

#### Table Mat with Snap and Ground Cord

P/N	Description	1-10	11-20	21+
M-36010	2' x 3', blue	\$47.60	\$42.65	\$39.10
M-36012	2' x 4', blue	57.95	51.90	47.60
M-36014	2' x 5', blue	86.75	77.70	71.30
M-36020	2' x 3', grey	47.60	42.65	39.10
M-36022	2' x 4', grey	57.95	51.90	47.60
M-36024	2' x 5', grey	86.75	77.70	71.30

#### Table-Mat Roll Stock

P/N	Description	1-10	11-20	21+
M-36050	2' x 50', blue	\$499.00	\$447.00	\$411.00
M-36052	30" x 50', blue	625.00	559.00	514.00
M-36054	3' x 50', blue	750.00	672.00	616.00
M-36060	2' x 50', grey	499.00	447.00	411.00
M-36062	30" x 50', grey	625.00	559.00	514.00
M-36064	3' x 50', grey	750.00	672.00	616.00

### BOTRON Mat-Grounding Accessories



### BOTRON Tech Square Antifatigue Mats

These vinyl-foam floor mats provide comfort and the best electricals of any antifatigue mats.

- Surface-resistivity reading of 2 x 10<sup>8</sup> • 3/8" thick
- Color: grey

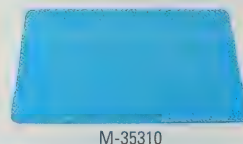


P/N	Description	1-10	11-20	21+
M-36510	2' x 4' mat, grey, with snap and 10' ground cord	\$49.95	\$44.70	\$41.05
M-36512	3' x 4' mat, grey, with snap and 10' ground cord	66.60	59.65	54.75
M-36514	4' x 5' mat, grey, with snap and 10' ground cord	109.60	98.15	90.00
P/N	Description	1-5	6-10	11+
M-36550	4' x 40' roll stock, grey	\$575.00	\$514.00	\$472.00

### BOTRON Tech-Operator Pad

This 1/4"-thick, blue pad is made from a solid-vinyl-foam and static-dissipative material that provides the user with a static-safe (2 x 10<sup>8</sup>), comfortable work area.

- Available in pads (18" x 23") or rolls (2' x 40')



P/N	Description	1-5	6-10	11+
M-35310	18" x 23" pad	\$11.10	\$10.25	\$9.50
P/N	Description	1-3		4+
M-35350	2' x 40' roll	\$252.50		\$216.50



## 3M 3-Layer Mats

3M 8200-series mats and runners have a unique 3-layer construction. The top layer is durable, static-dissipative vinyl which has sufficiently low resistivity to discharge static-laden conductors, yet will prevent the shorting of pins on the backs of printed-circuit boards laid on the mat.

- Middle layer is a highly conductive scrim that provides the main discharge path to ground
- Bottom layer is a durable nonskid cushion of static-dissipative foam

## 8200-Series Floor Mats

Includes one 15' 3040 ground cord and two 3050 female snap fasteners (installed).

## 8250-Series Floor Runners

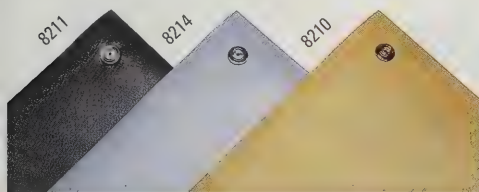
Includes two 15' 3040 ground cords and two 3050 female snap fasteners to be installed by customer.

## 8210-Series Table Mats

Includes two 3050 female snap fasteners (installed) and one 3048 wrist-strap grounding system.

## 8260-Series Table Runners

Includes two 15' 3040 ground cords and two 3050 female snap fasteners to be installed by customer.



P/N	Description	1-10	11-20	21+
8200	4' x 6' floor mat, gold	\$198.60	\$182.90	\$169.85
8201	4' x 6' floor mat, brown	198.60	182.90	169.85
8202	4' x 6' floor mat, beige	198.60	182.90	169.85
8203	4' x 6' floor mat, grey	198.60	182.90	169.85
8204	4' x 6' floor mat, blue	198.60	182.90	169.85
8205	4' x 6' floor mat, granite	198.60	182.90	169.85
8210	2' x 4' table mat, gold	84.15	77.50	71.95
8211	2' x 4' table mat, brown	84.15	77.50	71.95
8212	2' x 4' table mat, beige	84.15	77.50	71.95
8213	2' x 4' table mat, grey	84.15	77.50	71.95
8214	2' x 4' table mat, blue	84.15	77.50	71.95
8215	2' x 4' table mat, granite	84.15	77.50	71.95
P/N	Description	1-5	6-10	11+
8250	4' x 24' floor runner, gold	\$706.55	\$650.75	\$604.30
8251	4' x 24' floor runner, brown	706.55	650.75	604.30
8252	4' x 24' floor runner, beige	706.55	650.75	604.30
8253	4' x 24' floor runner, grey	706.55	650.75	604.30
8254	4' x 24' floor runner, blue	706.55	650.75	604.30
8255	4' x 24' floor runner, granite	706.55	650.75	604.30
8260	2' x 24' table runner, gold	384.10	328.50	305.80
8261	2' x 24' table runner, brown	384.10	328.50	305.80
8262	2' x 24' table runner, beige	384.10	328.50	305.80
8263	2' x 24' table runner, grey	384.10	328.50	305.80
8264	2' x 24' table runner, blue	384.10	328.50	305.80
8265	2' x 24' table runner, granite	384.10	328.50	305.80

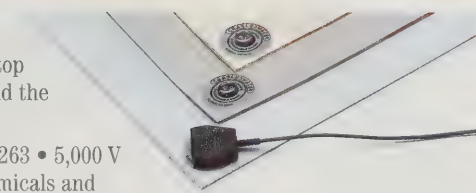
## CHARLESWATER Type Z2 Material

These vinyl mats feature a 3-layer construction. The top layer is dissipative vinyl, the middle is conductive, and the bottom is cushioned dissipative vinyl.

- Surface resistivity  $<10^9 \Omega/\text{Sq}$
- Meets DOD-HDBK-263 • 5,000 V to 0 V in  $<0.1 \text{ s}$
- .125" thickness
- Resists most chemicals and solvents
- Smooth finish makes for easy cleaning
- Recommended as bench-top material only

The mat-top kit includes: 1 bench mat, Type Z2 material, size as specified, 1 common-point ground kit (14213). The rolls do not include hardware.

Size	P/N Beige	P/N Blue	P/N Grey	Each
2' x 50' roll	42510	42500	42515	\$382.50
4' x 50' roll	42525	42520	42530	765.00



Size	P/N Beige	P/N Blue	P/N Grey	Each
2' x 3' mat-top kit	42450	42460	42470	\$48.40
2' x 4' mat-top kit	42455	42465	42475	56.65

## BOTRON 3-Layer Static-Control Mat

This 3-layer static-dissipative mat helps protect against ESD during manufacturing. Its durable top layer is solder flux resistant vinyl, its middle conductive layer is the main static drain, and its bottom layer is a dissipative-vinyl foam that provides additional cushioning and skid resistance.

- Surface resistivity of top and bottom layers:  $10^9\text{--}10^8 \Omega/\text{sq}$  per ASTM-D-257
- Table mat includes snap and 10' common-point-ground cord



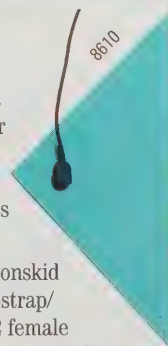
P/N	Description	1-10	11-20	21+
M-34510	2' x 3' blue table mat with ground cord	\$26.80	\$25.00	\$23.45
M-34512	2' x 4' blue table mat with ground cord	36.30	33.90	31.80
M-34514	2' x 5' blue table mat with ground cord	40.35	37.70	35.30
M-34516	2' x 6' blue table mat with ground cord	49.65	46.35	43.45
P/N	Description	1-5	6-10	11+
M-34550	2' x 40' blue roll stock	\$202.80	\$189.30	\$177.45
M-34552	30' x 40' blue roll stock	253.50	236.60	221.80
M-34554	3' x 40' blue roll stock	311.40	290.65	272.50

## 3M HIGHLAND™ Table Mats/Runners

These mats and runners feature a 2-layer construction. The top layer is a durable static-dissipative vinyl. The foam bottom layer is also static-dissipative and provides a durable nonskid cushion.

- Static-dissipative • Durable • Nonskid
- Each mat includes a 3048 wrist-strap/table-mat grounding system and 2 female snap fasteners (3050)
- Each runner includes 2 ground cords (15 ft) and 2 female snap fasteners.

P/N	Description	1-5	6-10	11+
8610	2' x 4' table mat, green	\$36.60	\$34.40	\$32.10
8613	2' x 24' table runner, green	229.05	216.10	201.70

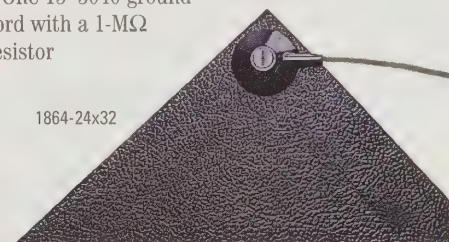


## 3M Conductive Mats

The main purpose of a conductive floor mat or runner is to remove static discharge from personnel as they approach work areas. This could include supervisors and parts delivery personnel, as well as a worker who removes his or her wrist strap and momentarily steps away. Floor mats provide significant passive protection in well-traveled assembly areas. Continuous runners extend static protection throughout and between entire areas.

## 1864 VELOSTAT Floor Mat

- Two 3034 female snap fasteners (installed)
- One 15' 3040 ground cord with a 1-M $\Omega$  resistor



P/N	Description	1-5	6-10	11+
1864-24x32	VELOSTAT floor mat, .125" thick, 24" x 32"	\$73.85	\$69.40	\$64.75
1864-48x72	VELOSTAT floor mat, .125" thick, 4' x 6'	198.65	186.70	174.25
1864-48x96	VELOSTAT floor mat, .125" thick, 4' x 8'	259.05	243.45	227.20

## 1864R VELOSTAT Floor Runner

- Two 15' 3040 ground cords with 1-M $\Omega$  resistor
- Five female 3034 snap fasteners • One snap-fastener installation tool

P/N	Description	1-5	6-10	11+
1864R-2x50	VELOSTAT floor runner, .125" thick, 2' x 50'	\$745.40	\$700.55	\$653.85

## 1880 VELOSTAT Floor Mat

- Two 3034 female snap fasteners (installed)
- One 15' 3040 ground cord with a 1-M $\Omega$  resistor

P/N	Description	1-5	6-10	11+
1880	VELOSTAT rigid floor mat, .125" thick, 4' x 6'	\$233.55	\$219.55	\$204.90



### 3M Static-Dissipative Rubber Mats and Runners

These rubber mats and runners consist of a top layer of static dissipative rubber laminated to a bottom layer of conductive rubber. The synthetic rubber work surface offers excellent resistance to oil, grease, and most common solvents.

- Electrically stable • Mechanically stable with excellent "lay-flat" capabilities
- Easy to clean • Significant resistance to damage from heat, solder, and soldering iron tips as compared to vinyls • Available in 24", 30", 36", and 48" widths
- Colors: blue or grey

#### Static-Dissipative Rubber Table Mats

Each table mat includes a Model 3048 wrist-strap/table-mat grounding system and 2 Model 3034 female snap fasteners (installed).

Size	P/N-Grey	P/N-Blue	1-10	11-20	21+
2' x 4'	8810	8811	\$84.15	\$78.05	\$71.95
2.5' x 4'	8820	8821	105.15	96.80	92.25
3' x 4'	8830	8831	126.15	118.60	110.65

#### Static-Dissipative Rubber Table Runners

Each table runner includes 2 Model 3040 15' grounding cards and 5 Model 3034 female snap fasteners (not installed).

Size	P/N-Grey	P/N-Blue	1-5	6-10	11+
2' x 24'	8840	8841	\$384.10	\$361.00	\$336.95
2.5' x 24'	8850	8851	525.60	494.00	461.05
3' x 24'	8860	8861	630.70	592.80	553.25

#### Static-Dissipative Rubber Floor Mats

Each table runner includes 2 Model 3040 15' grounding cards and 5 Model 3034 female snap fasteners (not installed).

Size	P/N-Gray	P/N-Blue	1-5	6-10	11+
4' x 6'	8870	8871	\$198.60	\$186.70	\$174.20

### 3M Mat-Grounding Accessories



#### 3040 Ground Cord

The 3040 is the standard ground cord for 3M floor mats. It is 15' long with a large male insulated snap at one end for connecting it to a mat, and a ring-tongue terminal at the other end for connecting it to a ground.

P/N	Description	1-20	21-49	50+
3040	Ground cord	\$13.05	\$12.25	\$11.45
3042	Wrist-strap grounding system	20.15	18.95	17.70
3039	Swivel connector	18.45	17.35	16.20
3048	Grounding system for wrist strap/table mat	15.90	14.90	13.95
3050	Snap connector for soft mats	12.35	11.60	10.85

#### 3042 Wrist-Strap Grounding System

The 3042 provides a convenient common grounding location for 2 wrist-straps. Compact, it mounts to any flat, rigid surface and is clearly marked with a ground symbol.

#### 3039 Swivel Connectors

This swivel connector is for attaching wrist-strap ground cords to the 8200-series table mats, to provide greater freedom of movement.

#### 3048 Grounding System for Wrist-Strap/Table Mat

When snapped onto one of the connectors at the corners of the table mat, the 3048 grounding system provides a reliable common point ground for 1 or 2 wrist straps and the table mat.

#### 3050 Snap Connector for Soft Mats

This female snap connector is designed for installation on any of the 8200 series of floor mats, table mats, and runners.

### CHARLESWATER Type T2 Dual-Layer Material

Made from a new generation of elastomeric polymers with a cross-linked molecular structure, Type-T2 provides superior charge dissipation and is resistant to heat and chemicals. Solder and flux do not damage the surface. This synthetic rubber matting is unaffected by most chemicals and solvents. Type-T2 is reversible and resistant to abrasion. The 2-layered construction provides a static-dissipative surface and a conductive surface. The dissipative layer makes an excellent table mat for soldering and assembly areas. The conductive layer provides a durable, slip-resistant flooring surface, ideal for use with conductive footwear.

- Construction: dual-layer rubber material • Thickness: 0.060" (1.5 mm) • Heat resistance: 32 °F-290 °F (0 °C-143 °C), continuous • Colors: blue, grey, and beige

Each mat-top kit includes: Type-T2 mat as specified, 14213 common-point kit with snap (customer installed).

Size	P/N-Beige	P/N-Blue	P/N-Grey	1-10	11-20	21+
<b>Mat-Top Kits</b>						
2' x 3'	66030	66040	66050	\$51.50	\$48.40	\$44.95
2' x 4'	66035	66045	66055	63.70	59.80	51.85

Size	P/N-Beige	P/N-Blue	P/N-Grey	1-5	6-10	11+
<b>Rolls (grounding hardware is not included)</b>						
2' x 40'	66060	66070	66080	\$416.15	\$391.70	\$339.45
3' x 40'	66065	66075	66085	624.25	587.50	509.20
4' x 40'	66090	66095	66100	832.35	783.35	678.90

### CHARLESWATER Mat-Grounding Accessories

- A complete selection of grounding accessories for mat materials



P/N	Description	1-20	21-49	50+
14201	10' quad common-point ground without resistor	\$12.20	\$11.45	\$9.90
14202	10' quad common-point ground with resistor	12.20	11.45	9.90
14206	15' common-point ground for bench mats and wrist straps, with resistor	12.00	11.30	9.75
14208	15' common-point ground for bench mats and wrist straps, without resistor	12.00	11.30	9.75
14213	Complete bench-ground kit includes: 14206 ground cord, 14988 universal snap-kit, and 12940 ground label	12.95	12.15	10.55
14234	Complete floor-ground kit, includes: 14233 ground cord, 14988 universal snap-kit	13.40	12.50	10.90
14233	15' ground cord for floor mats, with resistor	12.00	11.30	9.80
14232	15' ground cord for floor mats, without resistor	12.00	11.30	9.80
14260	Dual bench-mount ground for wrist-straps	12.75	11.95	10.35
14975	Push-and-clinch snap for grounding mats	1.60	1.50	1.30
14976	10-mm stud adapter to a 10-mm stud	1.10	1.00	.90
14977	10-mm socket adapter to a 10-mm socket	1.10	1.00	.90
14988	Universal snap-mounting kit	2.00	1.85	1.65

### CLAUSS Softy Mats

- Cushioned surface protects delicate assemblies • Work surface depresses easily to let fingertips or tweezers get a good grip on small parts • Inexpensive and disposable • Surface resistivity 10<sup>11</sup> Ω/sq

P/N	Description	1-50	51-200	201+
M11	11" x 14" mats	\$3.55	\$2.80	\$2.40
M14	14" x 22" mats	6.20	4.95	4.20

M14





### 3M Static-Control Antifatigue Mat

Standing for long periods of time on hard floor surfaces is 1 of the most common causes of physical fatigue. The 3M 9500 Series antifatigue matting may be the simplest and most effective way to reduce standing-worker fatigue while providing ideal protection against static-electricity problems. The mats are carbon-loaded rubber with the carbon being mixed evenly throughout the material to ensure that the edges are as conductive as the center. Resistance from the surface of the mat to the grounding point—the truest measure of a mat's static-draining capacity—is typically in the range of  $1 \times 10^4$  to  $1 \times 10^6$  (measured according to ESD Standard 7.1).

The rubber surface is bonded to a highly resilient insulative sponge base. This construction provides outstanding cushioning and reduces stress on the spine and lower back, preventing worker fatigue.

• Thickness: 1/2" • Mat includes installed ground snap and 15' ground cord



9500

P/N	Description	Each
9500	Conductive antifatigue mat, 3' x 5'	\$184.50

### TSC UNIFLOOR Conductive Flooring Material

This smooth homogeneous conductive vinyl is designed for use as floor mats, floor runners, or full-area-coverage flooring. Even though the material is very flexible, it is extremely durable. The electrical properties do not change for the life of the material as long as it is maintained with approved neutral, nonfilm-forming detergents and water. The flooring can be laid loose or taped down with TSC SIGAWAY® electronic conductive double-sided adhesive tape.

• Resistance to ground:  $<1.2 \Omega \times 10^6 \Omega$  • Thickness: .080" (gauge)  
• Never curls—always lays flat • Suitable for clean rooms • Full-surface black conductive backing • Colors: white, blue, and aluminum grey

#### TSC SIGAWAY® Electronic Conductive Double-Sided Adhesive Tape

• Resistance to ground:  $<1.2 \Omega \times 10^4 \Omega$  • Odor-free, solvent-free, non-toxic • Tape is releasable for re-installation of flooring  
• No waiting—installations may be subjected to rolling loads immediately • Install over existing concrete, failed epoxy, wood, metal, vinyl, terrazzo, old asbestos tile, or carpet (limited)

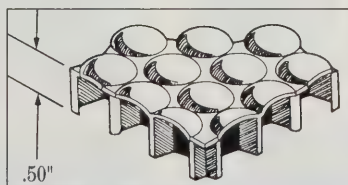


P/N	Description	1	2+
6015	Blue conductive vinyl, 4' x 99'	\$1669.00	\$1559.00
6090	White conductive vinyl, 4' x 99'	1669.00	1559.00
6095	Aluminum-grey conductive vinyl, 4' x 99'	1669.00	1559.00
7401	39" x 82' 6", conductive full-surface double-sided tape	385.00	357.15
7485-20025	8" x 82' 6", conductive full-surface double-sided tape, 5/box	465.00	433.00
7485-4025	1.6" x 82' 6", conductive double-sided adhesive tape, 6/box	203.00	188.60
4600-1220	1/2" x 66', copper tape, 2/pkg.	22.15	20.50

### DESCO Type I Interlocking Mat

This interlocking antifatigue mat is designed primarily to be used as a conductive ESD protective floor runner or in a whole-room flooring application. Its patented structure allows air to circulate under it to eliminate mold and mildew problems.

• Unique antifatigue dome/support cells provide extra comfort  
• Easily trimmed to give clean beveled edges • Interlocking strips allow for fast and easy installation • .50" thick • Color: black • RTG:  $2.0 \Omega \times 10^4 \Omega$



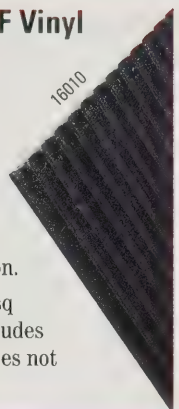
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P/N	Description	1-24	25+
A40930	Conductive interlocking mat, 24" x 36"	\$81.60	\$69.95

### CHARLESWATER Type F Vinyl Dissipative Flooring Material

This V-grooved material is designed for use as floor mats or floor runners. Its homogeneous, solid vinyl and corrugated underside provide excellent cushioning and traction.

• Surface resistance:  $1 \times 10^9 \Omega/\text{sq}$   
• Thickness: .125" • Mat kit includes 14234 ground kit • Roll stock does not include grounding hardware



P/N	Description	Each
16005	V-groove kit, 4' x 6', brown	\$102.00
16010	V-groove roll, 4' x 40', brown	420.60
14234	Snap and ground-cord kit	13.40

### DESCO Type S Antifatigue Mat

This soft-foam floor mat is designed to reduce human fatigue and for use where cushioning is required.

Type S material showed no loss of electrical properties due to wear and aging when used for over 10 years. This material should be grounded at approximately 6 foot intervals. Due to the thickness of this material, long grounding studs are required—DESCO 9864 Universal Snap Kit is recommended.

• Super cushioning • Beveled edges  
• Durable • Thickness: .375" (9.5 mm) • Colors: grey and grey with yellow safety stripe • Reduces fatigue • Added safety • Retains electrical properties with wear and aging for up to 10 years

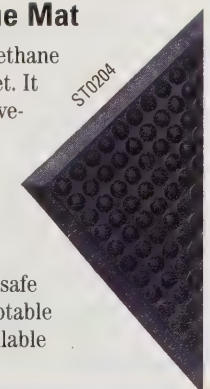


P/N	Description	1-5	6+
B82064	36" x 60' roll, grey	\$516.80	\$433.20
B82065	36" x 60' roll, grey with stripe	575.60	482.60

### ERGOMAT Antifatigue Mat

ERGOMAT is the only polyurethane antifatigue mat on the market. It effectively combats cumulative-trauma disorders associated with standing positions in feet, legs, and back.

• Will not lose its elasticity  
• Non-slip • Beveled edges  
• Chemical-resistant • ESD-safe  
• Class-100 clean-room acceptable  
• Grounding accessories available



P/N	Description	1-4	5+
ST0204	2' x 4' antifatigue mat	\$169.95	\$149.95
ST0305	3' x 5' antifatigue mat	318.50	276.00



## CHARLESWATER Type B Material

This reversible vinyl material has a smooth finish on 1 side and a nonglare finish on the other. It may be used with either side up. To extend the life of the mat, it can be turned over when 1 side is worn. Each mat-top kit includes: Type B material, as specified, and 14213 common-point-ground kit.

- Easy to cut
- Very durable
- .100" thick

### Mat-Top Kits

Size	P/N Beige	P/N Blue	1-10	11-20	21+
2' x 3'	16201	16213	\$37.60	\$35.35	\$30.60
2' x 4'	16202	16214	45.15	42.35	36.70

### Rolls (Grounding Hardware Not Included)

Size	P/N Beige	P/N Blue	P/N Brown	1-5	6-10	11+
24" x 40'	16250	16260	16270	\$262.85	\$246.90	\$213.95
24" x 100'	16251	16261	16271	657.00	617.15	534.85
30" x 40'	16255	16265	16275	328.55	308.60	267.45
30" x 100'	16256	16266	16276	821.30	716.35	668.60
36" x 100'	16257	16267	16277	985.55	859.60	802.30
48" x 100'	16258	16268	16278	1314.00	1146.15	1069.70

P/N	Description	Each
10435	REZTORE cleaner, 32 oz, trigger spray	\$5.65



## CHARLESWATER MICASTAT® Dissipative Laminate Pads

ICASTAT is a high-pressure static-dissipative laminate designed for workbench tops that are used in the manufacture and assembly of static-sensitive electronic components. Its patented multilayer construction features a conductive layer which ensures that the pad's dissipative properties are retained, independent of ambient humidity. MICASTAT has superior abrasion resistance and provides rapid, nonsparking charge dissipation. It is resistant to most solvents and greatly exceeds the NEMA specification for wear resistance.

- Instantly upgrades an existing bench top to a static-control work surface
- 1.5" radiused corners, no sharp corners
- Includes 10-mm female ground fastener (installed) and 14206 common-point ground cord

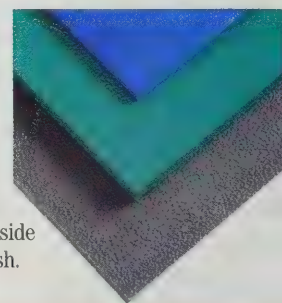
Size	P/N Beige	P/N Blue	P/N Grey	1-10	11-20	21+
2' x 3'	10310	10344	10342	\$86.70	\$78.65	\$70.60
2' x 4'	10350	10384	10382	106.10	96.25	86.35

## DESCO Type B+ Roll-Stock Material

This dissipative homogeneous-vinyl material meets EIA-625 with a surface resistance and resistance to ESD ground of less than  $10^6 \Omega$ . The extruded homogeneous vinyl can be used as either a bench or floor mat. It's easy to cut, very durable, and reversible—to extend mat life. One side has a smooth finish and the other a nonglare finish.

- .100" thick

Size	P/N Blue	P/N Grey	P/N Green	1-5	6-10	11+
24" x 40'	A16350	A16352	A16353	\$332.20	\$290.30	\$271.35
24" x 100'	A16355	A16357	A16358	831.30	727.45	680.00
30" x 40'	A16360	A16362	A16363	415.65	363.75	340.00
30" x 100'	A16365	A16367	A16368	1039.10	908.60	849.35
36" x 100'	A16370	A16372	A16373	1246.90	1091.15	1020.00
48" x 100'	A16375	A16377	A16378	1662.55	1452.85	1358.00



## CHARLESWATER STAT-WIPES and REZTORE™ Topical Antistat

STAT-WIPES are nontoxic, antistatic, and ideal for cleaning dissipative and conductive mats, electronic and medical instruments, and computer monitors and keyboards. STAT-WIPES clean without generating a static charge.

REZTORE topical antistat enhances the existing electrical properties of ESD surfaces and gives non-ESD surfaces electrical properties. The hard-coat formula provides a safe path to the ground on a variety of surfaces.



P/N	Description	Each
10600	STAT-WIPES, 160 per container	\$13.90
10415	REZTORE, 32 oz, trigger spray	8.70

## CHEMTRONICS STATIC FREE® PLAST-N-GLAS®

PLAST-N-GLAS dissipates electrostatic build-up while safely cleaning and polishing surfaces and improves the optical clarity of CRTs and instrumentation for distortion-free reading. It is compatible with all plastics, glass and stainless steel, and will not smear, streak, stain, or scratch.

- Nonflammable • Foaming spray won't run or drip
- Prevents attraction of dust and dirt



ES1668

P/N	Description	Carton Qty.	12	24-48	60+
ES1668	16-oz aerosol	12	\$6.65	\$6.20	\$5.80



*New Product: This symbol represents the industry's latest offerings.*

## CHEMTRONICS STATIC FREE Mat and Bench-Top Reconditioner

The STATIC FREE mat and bench-top reconditioner cleans and reconditions ESD mats and bench tops. It rejuvenates dead spots on ESD mats, bench tops, tool cribs, and production/assembly surfaces.

- Nonabrasive • Noncorrosive, chloride- and amine-free



ES1664T

P/N	Description	Each
ES1664T	16 fl. oz, trigger bottle	\$10.15
ES1664	1 gal	24.10

NOTE: Also available in 5-gal and 55-gal containers.



## CHARLESWATER Floor Finish

STATGUARD static-dissipative floor finish is a durable, static-control floor finish that prevents static charge generation and provides a clear, high-gloss finish that resists wear. STATGUARD floor stripper is a strong, nonammoniated, phosphate-free floor stripper formulated to break up and lift multiple layers of STATGUARD floor finish.

### Finish

- Surface resistance  $10^8 \Omega/\text{sq}$
- UL Listed as to slip resistance

### Stripper

- Biodegradable • Low pH formulation

### Cleaner

Formulated with dissipative agents that rejuvenate and improve the properties of STATGUARD floor finish.



P/N	Description	1-5	6-10	11+
10510	1 gal floor finish	\$41.65	\$37.80	\$33.90
10515	5 gal floor finish	201.55	183.65	165.70
10440	5 gal floor stripper	56.65	50.15	43.60
10560	1 gal cleaner	31.25	28.35	25.45
10565	5 gal cleaner	121.25	113.35	105.80

## ACL STATICIDE GOLD Floor Finish

This is a truly unique high-performance floor finish for controlling the generation and dissipation of static electricity on personnel.

- Long life: lasts 3–10 times longer than other floor finishes
- Applies quickly, requires less maintenance
- 30%–40% more coverage per gal
- Performs at lower relative humidity

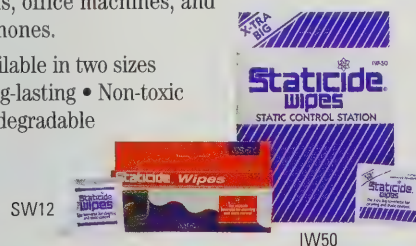


P/N	Description	Each
4500-1	Staticide GOLD, gal	\$57.20
4500-5	Staticide GOLD, 5 gal pail	257.45

## ACL STATICIDE Towelettes

The ultimate towelette for cleaning and static control. Ideal for use on computer screens and keyboards, office machines, and telephones.

- Available in two sizes
- Long-lasting • Non-toxic
- Biodegradable



P/N	Description	1-23	24-49	50+
IW50	Industrial size, 8" x 11" wipe, 50 per box	\$26.90	\$18.00	\$17.20
SW12	STATICIDE wipes, 24 per box	6.95	5.25	4.50
P/N	Description	Each		
2450	STATICIDE bulk wipes, 450 per case	\$121.50		

## ACL STATICIDE Topical Antistat

STATICIDE is an easy-to-use topical antistatic solution that provides a highly effective method of long-term static control. It's available in a concentrated formula or use heavy-duty formula for porous surfaces, or general-purpose formula for non-porous surfaces.

- Meets MIL-B-81705B and NFPA-56A electrostatic criteria
- Proven effective in relative humidity below 15%
- Nontoxic, nonflammable, completely biodegradable



P/N	Description	1-11	12-23	24+
2001	General-purpose STATICIDE, 1 gal	\$21.95	\$15.20	\$13.20
2003	General-purpose STATICIDE, 1 qt	8.75	6.05	5.25
520	Heavy-duty STATICIDE, 4-oz bottle	4.80	3.65	3.15
2002	Heavy-duty STATICIDE, 1 gal	48.85	33.80	29.30
2005	Heavy-duty STATICIDE, 1 qt	14.50	10.05	8.70
P/N	Description	Each		
3000Q	STATICIDE concentrate, 1 qt	\$150.00		
3000G	STATICIDE concentrate, 1 gal	495.00		

## ACL STATICIDE Cleaner

This is a nonabrasive cleaner designed for conductive surfaces and general use on workstations, table tops, and antistatic mats.

- Leaves no film • Nonstreaking
- Nonflammable



P/N	Description	1-23	24-49	50+
6001	Conductive cleaner, 1 qt	\$5.75	\$5.10	\$4.35
6002	Conductive cleaner, 1 gal	22.35	16.80	14.40

## 3M ESD Mat Cleaner

An extra-strength cleaner for removing dirt and stains from all types of static-control surfaces, including table and floor mats, hard-laminate bench-tops, and portable field-service kits. Used full strength, it is a clear, colorless, water-based liquid that leaves no tacky residue.

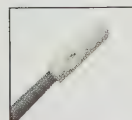


P/N	Description	1-23	24-49	50+
8001	Static-control cleaner, 1 qt	\$4.85	\$4.35	\$3.85

## COVENTRY M. R. TECHNOLOGY SWABS

These solvent-safe static-dissipative or conductive clean-room swabs are engineered to protect static-sensitive components.

- Very low levels of contamination
- Both have 0.14" foam heads



P/N	Description	Each
41050ESD	Swabs, 2.75" blue ESD handles, 500/bag	\$64.25
41050CON	Swabs, 2.75" grey conductive handles, 500/bag	74.15

## TECH SPRAY Cleaner

A neutral-pH cleaner for general use in production areas to remove insulating contaminants such as flux residues, oils, greases, dirt, and grime. As an antistatic mat and table-top cleaner, it eliminates the charge while leaving an antistatic agent that helps prevent static-charge build-up.

- Nonabrasive • Noncorrosive • Contains no ammonia



P/N	Description	1-11	12-23	24+
1733-PT	Trigger spray bottle, 1 pt	\$7.80	\$7.40	\$6.75
1733-QT	Trigger spray bottle, 1 qt	10.00	9.50	8.65
P/N	Description	1-3	4-11	12+
1733-G	1 gal bottle	\$22.70	\$21.60	\$19.60

## TECH SPRAY ZERO CHARGE® Screen and Keyboard Cleaner

With regular use, this foaming, aerosol cleaner eliminates static charges from sensitive surfaces and provides long-term static protection. It also removes hand oils, ink marks, dust, finger prints, and other soils from work areas.

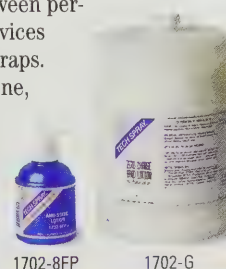


P/N	Description	Carton Qty.	Each
1743-6S	6 oz, aerosol	N/A	\$3.55
1743-50PK	50 presaturated wipes/packets in carton	1	15.70
1743-DSP	48 presaturated wipes in pop-up carton	12	10.10
1743-2FP	2 oz, finger pump	24	4.75
1743-PT	1 pt, plastic bottle with trigger	12	10.45

## TECH SPRAY ZERO CHARGE® Hand Lotion

This lotion's antistatic formulation is designed to improve the contact between personnel and grounding devices such as wrist and heel straps.

It does not contain silicone, lanolin, squalene, or similar materials often found in conventional hand lotions that can interfere with PCB manufacturing.



P/N	Description	1-23	24-99	100+
1702-8FP	8-oz with pump	\$4.25	\$4.05	\$3.65
P/N	Description	1-3	4-11	12+
1702-G	1 gal	\$34.85	\$33.15	\$30.00



## From the bench

### STATIC-SHIELDING BAGS

The birth of modern static-shielding bag has led to the development of films that must meet several criteria:

1. Shield components from outside static sources to less than 25 V
2. Be clear enough to allow identification of the bag's contents
3. Be heat-sealable or closeable with the use of a zipper
4. Be nontribocharging
5. Be relatively moisture proof

There are 2 types of shielding films currently available: metal-in and metal-out. The metal-in film is made up of 3 layers: a top layer of dissipative polyester, a layer of aluminum, and a layer of dissipative polyethylene. The metal-out film is made up of 4 layers: an abrasion-resistant coating, aluminum or nickel, polyester, and a dissipative polyethylene layer. The thickness of these films is from 3 mil to 4 mil. Both films rely on the use of metal to perform the function of shielding, and both films utilize dissipative layers to reduce the possibility of charge generation.

### Metal-Out Bags

The metal-out bag is designed with its conductive layer being nearest to the bag's surface. When a conductor, such as a shielding bag, is isolated from a ground, it may become charged and hold that charge. The bag must then have the charge removed before it is opened and the contents removed. Metal-out films allow for the most rapid charge reduction when a bag and its contents are set down on a grounded surface, typically a dissipative table mat. This type of film also provides for the lowest level of voltage shielding.

### Metal-In Bags

Metal-in film uses aluminum as the metal layer. The aluminum is sandwiched or buried between the outer polyester layer and the dissipative polyethylene layer. This eliminates the need for an abrasion layer and provides a less-conductive outer surface. It does not provide for shielding to the level of metal-out film, but the difference is only to within a few volts. We offer a variety of metal-out and metal-in static-shielding bags from the leading manufacturer's in the industry.

### 3M 1900 Series Metal-In Shielding Bags

- 3.1-mil thickness • .48-mil polyester layer
- Shielding layer is bonded between a topically coated static-dissipative polyester layer and a polyethylene layer • The coatings are amine-free and noncorrosive • Meets EIA-541 definition for static-shielding/dissipative packaging • 1910 Series features a dual-track closure for easy opening and closing • Sold in cartons of 100

### BAYSTAT STRATOGREY Metal-In Shielding Bags

- 3.1-mil thickness • Offers superior ESD protection for CMOS, MOS, and other highly ESD-sensitive components • Transparent, humidity-independent, and compatible with polycarbonate materials • Meets requirements of EIA-541 • Meets the electrical and physical requirements of MIL-B-81705, Type III • Printed with part numbers and date codes • Sold in cartons of 100

### CHARLESWATER Metal-In Shielding Bags

- 3.5-mil thickness • Greater than 50% light transmission • Resistivity: outer surface is  $10^{12}$   $\Omega$ /sq, metal layer is 100  $\Omega$ /sq, and inner surface is less than  $10^{12}$   $\Omega$ /sq • Charge decay in less than 100  $\mu$ s • Also available with zipper closure for convenient sealing • Sold in cartons of 100

### DESCO Metal-Out Shielding Bags

- 3.5-mil thickness • Light transmission of better than 40% allows for easy identification of contents without removal • Resistivity of outer surface:  $10^8$   $\Omega$ /sq • Resistivity of metal layer: 100  $\Omega$ /sq • Resistivity of inner surface:  $10^{11}$   $\Omega$ /sq • Also available with zipper closure • Sold in cartons of 100

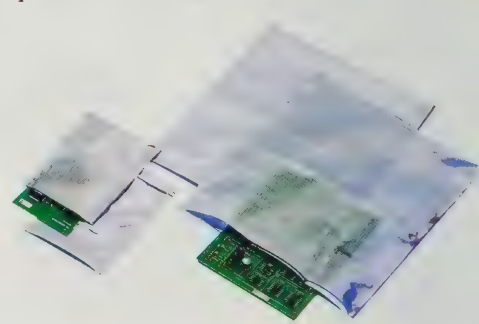
### RICHMOND RCAS 4250 Series Metal-In Shielding Bags

- 48-g polyester layer • Surface resistivity of the metal layer is less than  $10^2$   $\Omega$  per square to shield against static charges • Inner layer of static-dissipative polyethylene (RCAS 1206) is amine-free,

polycarbonate compatible, and octanoic-acid-free • Stamped with product number, manufacturer's name, lot number, and date • Sold in cartons of 100

### RICHMOND SS 4000 Series Metal-In Shielding Bags

- 48-g polyester layer • Most economical choice of RICHMOND static-shielding bags • Designed as a 1-time-use bag • Static-dissipative polyethylene inner layer is amine-free, polycarbonate compatible, and octanoic-acid-free • Stamped with product number, lot number, and date • Sold in case quantities as indicated



Size (W x L)	3M 1900 Series		RICHMOND RCAS 4250		RICHMOND SS 4000			CHARLESWATER	Metal-In	BAYSTAT STRATOGREY		DESCO Metal-Out	
	P/N	Per 100	P/N	Per 100	P/N	Qty.	Per Case	P/N	Per 100	P/N	Per 100	P/N	Per 100
3" x 5"	1900-3x5*	\$7.00	SS5-3x5	\$6.15	SS-3x5	1,000	\$28.85	13405*	\$4.75	BG-0305*	\$2.80	A13010*	\$6.85
4" x 6"	1900-4x6*	8.10	SS5-4x6	7.65	SS-4x6	1,000	36.55	13415*	5.30	BG-0406*	3.75	A13020*	8.50
5" x 8"	1900-5x8*	11.45	SS5-5x8	10.20	SS-5x8	1,000	50.00	13430*	8.35	BG-0508*	5.40	A13035*	11.45
6" x 8"	1900-6x8*	12.25	SS5-6x8	11.40	SS-6x8	1,000	56.10	13440*	8.95	BG-0608*	6.30	N/A	—
6" x 10"	1900-6x10*	14.95	SS5-6x10	13.10	SS-6x10	1,000	67.10	13445*	10.10	BG-0610*	7.60	A13050*	14.30
8" x 10"	1900-8x10*	18.40	SS5-8x10	16.25	SS-8x10	500	41.55	13460*	14.45	BG-0810*	9.65	A13065*	17.10
8" x 12"	1900-8x12*	20.20	SS5-8x12	18.65	SS-8x12	500	48.95	13465*	16.65	BG-0812*	11.20	A13070*	20.00
10" x 12"	1900-10x12*	24.70	SS5-10x12	22.15	SS-10x12	500	58.95	13470*	19.20	BG-1012*	13.75	A13075*	22.90
10" x 14"	1900-10x14*	28.80	SS5-10x14	24.95	SS-10x14	500	67.35	13475*	22.90	BG-1014	20.85	A13080*	25.80
10" x 24"	1900-10x24	49.30	SS5-10x24	43.05	SS-10x24	500	113.80	13485*	40.95	BG-1024*	39.80	A13090*	46.00
12" x 16"	1900-12x16*	39.00	SS5-12x16	35.35	SS-12x16	500	91.25	13500*	30.55	BG-1216*	20.60	A13110*	40.15
12" x 18"	1900-12x18*	43.85	SS5-12x18	38.75	SS-12x18	250	51.10	13505*	35.15	BG-1218*	22.20	A13115*	41.40
15" x 18"	1900-15x18	54.20	SS5-15x18	47.25	SS-15x18	250	62.65	13515*	45.05	BG-1518*	34.45	A13125*	48.75
18" x 24"	1900-18x24	85.95	SS5-18x24	75.00	SS-18x24	250	96.80	13525*	69.95	BG-1824*	32.30	A13135*	75.60

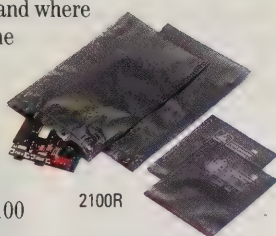
\* Available with zipper closure. Call for part number and price.



## 3M 2100R Series Bags

This high-performance bag is for your most static-sensitive products and where cleanliness is of prime importance.

- Embossed
- Testable • Re-usable • Available with zipper closure
- Sold in cartons of 100



2100R

P/N	Size	1-10	11+
2100R-3x5	3" x 5"	\$14.85	\$13.00
2100R-4x6	4" x 6"	19.35	16.95
2100R-8x10	8" x 10"	40.65	35.60
2100R-10x14	10" x 14"	67.75	59.40

### With Zipper

P/N	Size	1-10	11+
2110R-4x6	4" x 6"	\$25.40	\$22.25
2110R-8x10	8" x 10"	53.35	46.80

## CHARLESWATER Moisture-Vapor-Barrier Bags

This bag combines the properties of a moisture-vapor barrier with EMI, RFI, and ESD shielding. It is manufactured from film (Type 1, Class N652-260M) which meets the requirements of MIL-B-81705-C. The moisture-vapor transmission rate (MVTR) also meets the requirements of MIL-B-131 and EIA-583. The configuration is basically the same as a metal-in-bag except that it has a metal layer which is 5 times as thick and is sandwiched between 2 layers of material—a polyethylene layer to provide pull strength and a polyester layer to provide puncture strength and heat-seal capability.

- All printed bags are lot and date coded to ensure quality and traceability • Sold in cartons of 100

### Desiccant Pack MIL-D-3464

This Type I and II desiccant is packaged in moisture-proof cans and drums. Absorbs residual moisture

### Humidity Indicator Card

These 2" x 3" blotting-paper cards come in cans of 100, indicate 10%, 20%, 30%, and 40% RH with a color-comparison bar, and meet the requirements of MIL-I-8835.



13812

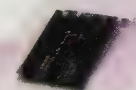
13806

P/N	Description	1-10	11+
13806	5" x 8"	\$17.85	\$14.50
13812	8" x 10"	32.00	26.00
13816	10" x 12"	49.50	40.30
13820	10" x 24"	88.80	72.25
13822	10" x 30"	109.40	89.05
13824	12" x 16"	75.85	61.70
13832	18" x 24"	150.75	122.65
P/N	Description	Each	
13870	Humidity indicator card, 100 per can	\$47.05	
13850	Desiccant, 1/2 unit, 550 per pail	111.40	
13852	Desiccant, 1 unit, 300 per pail	90.20	

## ARMAND Dissipative Bags

These bags are made from specially formulated resins which give the film exceptional strength and puncture resistance. Decay and resistivity properties are present in equal levels on both sides of the film. This is a revolutionary humidity-independent, micro-encapsulated, amine-free, nongassing, static-dissipative film.

- Humidity independent • Does not promote corrosion • No measurable outgassing • N-octanoic acid free • Available in 4 mil or 6 mil • Superior seal strength
- Abrasion-resistant
- Sold in cartons of 100



2064DKE

2004DKE

P/N	Description	1-49	50+
2004DKE-3x5	4-mil antistatic flat bag	\$3.90	\$3.25
2004DKE-4x6	4-mil antistatic flat bag	4.40	3.65
2004DKE-5x8	4-mil antistatic flat bag	7.25	6.05
2004DKE-8x10	4-mil antistatic flat bag	10.40	8.70
2004DKE-10x12	4-mil antistatic flat bag	13.75	11.45
2004DKE-12x18	4-mil antistatic flat bag	22.85	19.05
2064DKE-4x6	4-mil antistatic zipper bag	11.65	9.70
2064DKE-6x8	4-mil antistatic zipper bag	17.50	14.60
2006DKE-3x5	6-mil antistatic flat bag	4.80	4.00
2006DKE-4x6	6-mil antistatic flat bag	6.40	5.35
2006DKE-6x8	6-mil antistatic flat bag	10.60	8.85
2006DKE-8x10	6-mil antistatic flat bag	14.50	12.10
2006DKE-10x12	6-mil antistatic flat bag	19.80	16.50
2006DKE-12x18	6-mil antistatic flat bag	33.60	28.00
2066DKE-4x6	6-mil antistatic zipper bag	13.00	10.80
2066DKE-6x8	6-mil antistatic zipper bag	19.00	15.80

## RICHMOND DRYPACK PACKAGING

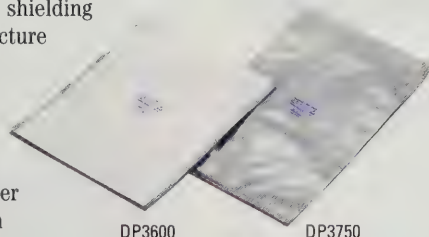
The DRYPACK Series is designed specifically for the critical requirements (ESD and moisture-vapor barrier) of moisture-sensitive devices, components, and solder-reflow process surface-mount devices.

### DRYPACK 3600 Features

- Moisture-vapor barrier • ESD shielding
- Heat sealable • Superior puncture resistance of TYVEK

### DRYPACK 3750 Features

- Static-dissipative inner and outer layers • Protects against EMI • Heat sealable • Tough outer layer of biaxially-oriented nylon



DP3600

DP3750

### DRYPACK 3600

P/N	Size	1-10	11+
DPT-16x18	16" x 18", 100 per carton	\$167.75	\$151.45
DPT-10x28	10" x 28", 100 per carton	197.30	178.10

### DRYPACK 3750

P/N	Size	1-10	11+
DPN-10X20	10" x 20", 100 per carton	\$78.60	\$69.95
DPN-10X30	10" x 30", 100 per carton	108.95	98.35
DPN-16X18	16" x 18", 100 per carton	106.65	96.30

## CORSTAT DIP Tube Bags

CORSTAT DIP shielding bags are used for physical and electrical protection of components shipped in tubes. They are conductive inside, and made of a durable 2-ply construction to add cushioning.

- Recyclable • Printed • Static shielded • Economical • Durable construction • Sold in bundles of 100



CB4226

P/N	Description	Each
CB4226	CORSTAT DIP tube bags, 4" (W) x 1-3/4" (D) x 26" (L), 100/bundle	\$27.25

## WESCORP ESD-Safe Rubber Bands

- Pink antistatic rubber bands (surface resistivity:  $10^{10}$ ) • Black static-dissipative rubber bands (surface resistivity:  $10^6-10^9$ )



P/N	Description	Bag
WARB-2018	Pink AS rubber bands, 2" x 1/8", 1,858/bag	\$15.00
WARB-3518	Pink AS rubber bands, 3-1/2" x 1/8", 767/bag	15.00
WARB-5014	Pink AS rubber bands, 5" x 1/4", 363/bag	19.00
WARB-8014	Pink AS rubber bands, 8" x 1/4", 209/bag	15.00
WCRB-3016	Black SD rubber bands, 3" x 1/6", 1,980/bag	23.00
WCRB-4518	Black SD rubber bands, 4-1/2" x 1/8", 705/bag	23.00
WCRB-5014	Black SD rubber bands, 5" x 1/4", 383/bag	23.00
WCRB-7518	Black SD rubber bands, 7-1/2" x 1/8", 400/bag	23.00



## CHARLESWATER Conductive Foam

This is a polyurethane open-cell foam designed to protect devices from ESD and physical damage. It is ideal for long-term storage because it is corrosive-resistant.

- High-density foam for direct lead insertion • Low-density foam cushions and protects • 24" x 36" sheets

P/N	Thickness	Each	P/N	Thickness	Each
<b>High-Density Foam</b>			<b>Low-Density Foam</b>		
12150	1/8"	\$8.85	12100	1/8"	\$5.50
12250	1/4"	15.45	12200	1/4"	12.35
12350	3/8"	23.60	12300	3/8"	14.20
12450	1/2"	32.10	12400	1/2"	16.55
12550	3/4"	37.95	12500	3/4"	25.90
12650	1"	47.70	12600	1"	31.45

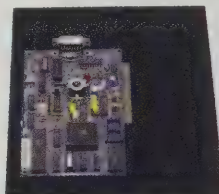


12250

## CHARLESWATER Cross-Linked Conductive Foam

This polyethylene foam is used for protecting static-sensitive devices from electrostatic charges. It's a pin-insertable-grade foam that shunts all the leads of a component, creating an equal electrical potential that protects against possible ESD damage.

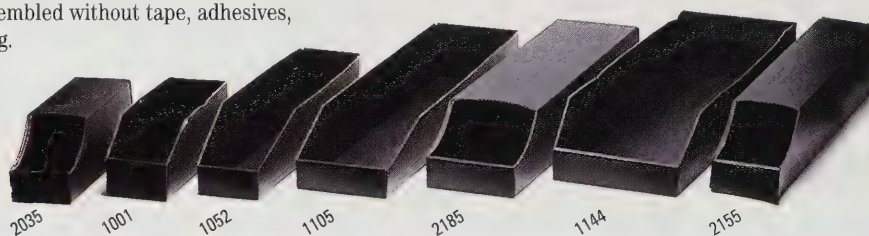
- Noncorrosive
- Extremely durable
- Size: 24" x 35"
- Thickness: 1/4"



12660

## CCI Bin Boxes

CORSTAT™ static shielding bin boxes are sturdy, durable, and can be stacked. They fit industry-standard shelving and carousel systems, and are easily assembled without tape, adhesives, or stapling.



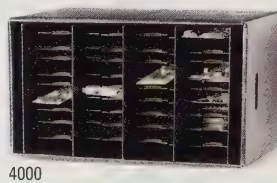
P/N	ID (L x W x H)	1-99	100+
<b>Closed, Stackable</b>			
2035	11-1/4" x 3-3/4" x 4-1/4"	\$5.55	\$4.40
2065	11-1/4" x 6-3/4" x 4-1/4"	3.60	2.80
2095	17-1/4" x 3-3/4" x 4-1/4"	3.60	2.80
2155	24" x 4" x 4-1/4"	4.75	3.75
2185	24" x 5-3/4" x 4-1/4"	4.85	3.80
2015	24-1/8" x 7-3/4" x 4-1/4"	5.65	5.30
<b>Open</b>			
0950	11-1/4" x 1-3/4" x 4-1/4"	\$2.40	\$1.90
1001	11-1/4" x 3-3/4" x 4-1/4"	2.50	1.95

P/N	ID (L x W x H)	1-99	100+
1003	11-1/4" x 5-3/4" x 4-3/8"	3.30	2.60
1010	11-1/4" x 7-3/4" x 4-1/4"	3.90	3.05
1020	11-1/4" x 11-3/4" x 4-3/8"	4.20	3.30
1052	17-1/4" x 3-3/4" x 4-3/8"	3.30	2.60
1053	17-1/4" x 5-3/4" x 4-3/8"	3.50	2.80
1054	17-1/4" x 7-3/4" x 4-3/8"	4.20	3.30
1105	24" x 4" x 4-1/2"	3.60	2.80
1125	24" x 5-3/4" x 3-3/4"	4.25	3.35
1144	24" x 8" x 4-1/2"	4.35	3.45

## CCI CORSTAT® In-Plant Handlers

These in-plant totes/handlers are made from durable, conductive, corrugated CORSTAT. All tote walls and partitions are rolled over for added strength. They are recyclable and reusable.

- Static-shielding • Shipped KD • Low cost • Eliminates bagging labor • Drop-shipped only



4000

P/N	Max. Cell Size (L x W x H)	Number of Cells	Tote Size (L x W x H and ID)	Each
4000	4-7/8" x 1" x 13"	40	22-34" x 12-1/2" x 13"	\$33.55
4000-1	6-9/16" x 1" x 13"	30	22-3/4" x 12-1/2" x 13"	32.05
4000-2	10" x 1" x 13"	20	22-3/4" x 12-1/2" x 13"	30.55
4000-3	20-1/4" x 1" x 13"	10	22-3/4" x 12-1/2" x 13"	29.00
4003	16" x 3/4" x 18-7/8"	10	18" x 10" x 18-7/8"	33.80
4005	4-11/16" x 3/4" x 11-1/4"	30	16-5/8" x 9-3/4" x 11-1/4"	24.10
4005-1	7-1/8" x 3/4" x 11-1/4"	20	16-5/8" x 9-3/4" x 11-1/4"	22.85
4005-2	14-1/2" x 3/4" x 11-1/4"	10	16-5/8" x 9-3/4" x 11-1/4"	21.55
4007	4-11/16" x 3/4" x 7"	30	16-5/8" x 9-3/4" x 7"	17.60
4007-1	8" x 3/4" x 7"	20	16-5/8" x 9-3/4" x 7"	16.95
4007-2	14-1/2" x 3/4" x 7"	10	16-5/8" x 9-3/4" x 7"	16.30
4009	5-3/4" x 1-5/8" x 6-1/8"	20	18-1/2" x 13-3/4" x 6-1/8"	22.00
4009-1	11-3/4" x 1-5/8" x 6-1/8"	10	18-1/2" x 13-3/4" x 6-1/8"	21.05
4011	3/4" x 3/4" x 3-7/8"	100	10-3/8" x 10-3/8" x 4"	11.05

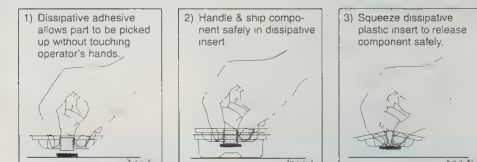
## CCI SM COMPAK Shippers

These shippers provide physical and static protection for SM components (1/2" x 1/2" or larger). They fit many types of components.

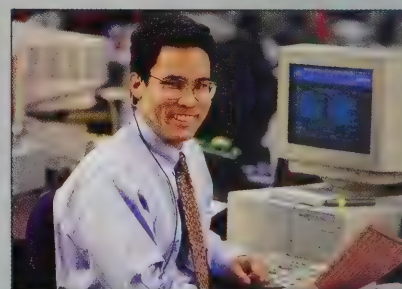
- Surface-mount shippers • Fit and protect many sizes and styles of components • Eliminate lead damage • Shielding mailer, dissipative insert



SM5025



P/N	Description	Each
SM5025	2-3/4" (L) x 2-3/4" (W) x 15/16" (H), for 1 device	\$2.55
SM5045	5-3/4" (L) x 2-3/4" (W) x 15/16" (H), for 2 devices	4.10
SM5055	5-3/4" (L) x 5-3/4" (W) x 15/16" (H), for 4 devices	7.10
SM5060	14-3/4" (L) x 5-3/4" (W) x 15/16" (H), for 10 devices	14.50



We're Here to Help You  
with Your Questions



## CCI CORSTAT® COMPAK® Shippers

These integrated-circuit shippers provide the effective static shielding protection of industry-proven CORSTAT. They feature laminated antistatic polyurethane foam at the top, and removable conductive foam on the bottom.

- Faraday cage effect
- Meets EIA static-shielding standards
- Printed with static warning



P/N	ID (L x W x H)	1-99	100+
IC5000	2-1/2" x 1-1/4" x 1"	\$1.45	\$1.25
IC5010	3-1/2" x 1-1/4" x 1"	1.65	1.25
IC5030	3-7/16" x 2-1/8" x 15/16"	1.75	1.45
IC5040	3-3/4" x 3-3/4" x 1"	2.10	1.80
IC5050	7" x 3-1/2" x 1"	2.95	2.70

## CCI CORREC-PAK® Shippers

CORREC-PAK containers protect sensitive electronic components. Physical protection is provided by static dissipative polyurethane cushioning material.

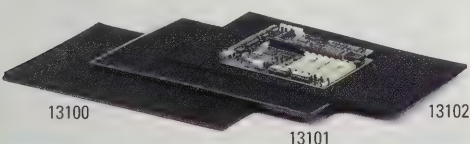
- Faraday cage protection • Shielding surface on both sides • 200# "B" flute • Reusable • Printed with static warning • Type C: shielding on both sides, KD, no foam • Type L: Shielding on both sides, assembled with foam

P/N	ID (L x W x H)	Type C	Type L
3080-1	7" x 5" x 1-1/2"	\$1.30	\$2.55
3190-4	9" x 7-1/2" x 2-1/2"	2.55	5.25
3220-5	10-1/2" x 8-1/2" x 1-1/2"	2.60	6.20
3320-8	12-1/2" x 10-1/2" x 2-1/2"	3.90	7.65
3610-12	20-1/2" x 15-1/2" x 2-1/2"	5.00	13.20
3420-13	14-7/8" x 6-5/8" x 2"	2.65	5.10

## CCI Process Trays

Use these trays for assembly, transport, and storage of sensitive PC boards and devices. The CORSTAT tray is available with 1/4" conductive foam attached or conductive plastic tray with removable/reversible conductive foam.

- Economical • Conductive cross-linked foam



P/N	Description	1-49	50+
13100	18" x 12" CORSTAT tray, with 1/4" conductive foam (attached)	\$10.55	\$9.85
13101	18" x 12" conductive plastic tray, with 1/4" conductive foam (not attached)	19.00	17.70
13102	18" x 12" x 1/4" conductive cross-linked foam only	5.65	5.30

## Marshall ESD Tapes

- Clear cellophane tape • Rubber-based adhesive for minimum ESD • Also available printed with ESD symbol

P/N	Description	1-24	25-49	50+
M-36101	1/2" wide, 1" core, 108' tape	\$1.40	\$1.20	\$1.00
M-36102	1/2" wide, 3" core, 216' tape	1.65	1.40	1.20
M-36103	3/4" wide, 1" core, 108' tape	1.95	1.65	1.40
M-36104	3/4" wide, 3" core, 216' tape	2.45	2.05	1.75
M-36105	1" wide, 1" core, 108' tape	2.60	2.20	1.85
M-36106	1" wide, 3" core, 216' tape	3.20	2.70	2.30
M-36107	2" wide, 3" core, 216' tape	6.00	5.00	4.30

- Clear cellophane tape with printed ESD symbols • 3" core • 216' (L)

P/N	Description	1-24	25-49	50+
M-36142	Printed tape, 1/2" (W)	\$4.35	\$3.65	\$3.10
M-36144	Printed tape, 3/4" (W)	5.95	4.95	4.25
M-36146	Printed tape, 1" (W)	7.45	6.20	5.30
M-36147	Printed tape, 2" (W)	13.55	11.30	9.70

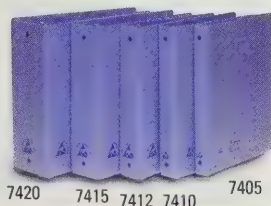
- Conductive grids embedded inside film • Shields package contents • Prevents static build-up

P/N	Description	1-24	25-49	50+
M-36110	1/2" wide, 3" core, 118' tape	\$2.10	\$1.75	\$1.50
M-36111	3/4" wide, 3" core, 118' tape	3.85	3.20	2.75
M-36112	1" wide, 3" core, 118' tape	4.35	3.60	3.10
M-36113	2" wide, 3" core, 118' tape	8.05	6.70	5.75

## DESCO 3-Ring Binders

These 3-ring binders hold 8-1/2" x 11" sheets. They are covered with a 16-mil static-dissipative vinyl that is durable and long lasting.

- Available in 5 ring sizes • Color: sky blue • Surface resistivity: 10<sup>11</sup> Ω



P/N	Description	1-24	25-49	50+
7405	1/2" ring, blue, static-dissipative binder	\$12.80	\$11.85	\$11.00
7410	1" ring, blue, static-dissipative binder	11.90	10.90	10.15
7412	1-1/2" ring, blue, static-dissipative binder	12.80	11.85	11.00
7415	2" ring, blue, static-dissipative binder	14.75	13.60	12.65
7420	3" ring, blue, static-dissipative binder	18.55	17.10	15.90



- High-temperature, antistatic masking tape • Replaces KAPTON, which is a static generator • Designed for wave-solder applications • Withstands 275-°F exposure up to 45 min

P/N	Description	1-24	25-49	50+
M-36120	1/2" wide, 3" core, 180' tape	\$2.70	\$2.25	\$1.95
M-36121	3/4" wide, 3" core, 180' tape	3.80	3.20	2.70
M-36122	1" wide, 3" core, 180' tape	5.10	4.25	3.65
M-36123	2" wide, 3" core, 180' tape	9.30	7.75	6.65
M-36124	3" wide, 3" core, 180' tape	11.10	9.25	7.95

- ESD-safe tape dispenser • Cast metal with ground cord • For 1" or 2" tape on 3" cores

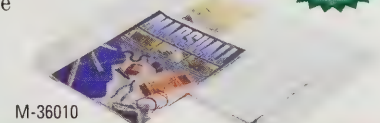
P/N	Description	1-2	3+
M-36129	For 1" tape, 3" core	\$64.35	\$53.60
M-36131	For 2" tape, 3" core	72.75	60.60

- Yellow vinyl floor tape for use around workstations to warn personnel that they are entering an ESD-safe work area • 3" wide x 36 yd long

P/N	Description	1-4	5-9	10+
M-36412	ESD-warning tape	\$44.15	\$40.50	\$37.35

## Marshall ESD Sheet Protectors

- Provide a safe environment for document handling in ESD-controlled areas • Made from STATICURE®, a clear dissipative film with non-contaminating surfaces • 6 mil thick • 3-hole punched • 100/case



P/N	Description	List	Each
M-36010	8-1/2" x 11" sheet protector	\$66.00	55.00

## MARSHALL ESD Booklet

An illustrated 15-page booklet titled "What You Should Know About Electrostatic Discharge Control" designed to be used as a supplement to in-house training on ESD.



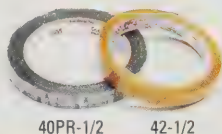
P/N	Description	1-49	50-99	100+
M-38010	ESD booklet	\$ .95	\$ .85	\$ .75



### 3M SCOTCH Antistatic Utility Tape

3M SCOTCH 40 tape is a breakthrough in PSA-tape technology. It helps prevent ESD damage to sensitive electronic components.

- 72 yards per roll
- Plastic core



P/N	Description	1-4	5-9	10+
40PR-1/4	Antistatic utility tape	\$5.25	\$4.20	\$3.65
40PR-3/8	Antistatic utility tape	7.85	6.25	5.50
40PR-1/2	Antistatic utility tape	10.45	8.35	7.30
40PR-3/4	Antistatic utility tape	15.65	12.60	10.95
40PR-1	Antistatic utility tape	20.85	16.70	14.60

### 3M Antistatic High-Temp. Utility Tape

It is designed specifically for use in printed-circuit-board, high-temperature solder applications to mask gold fingers and other components.

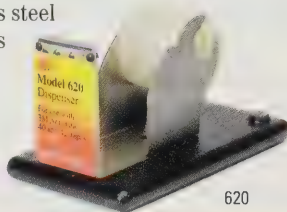
- 36 yards per roll

P/N	Description	Each
42-1/4	Antistatic high-temp. utility tape	\$11.90
42-3/8	Antistatic high-temp. utility tape	17.80
42-1/2	Antistatic high-temp. utility tape	23.70
42-3/4	Antistatic high-temp. utility tape	35.55
42-1	Antistatic high-temp. utility tape	47.40

### 3M Model 620 Tape Dispenser

The new Model 620 tape dispenser is designed for use in ESD-protected areas. The 620 is made of conductive- and static-dissipative materials that minimize or eliminate problems associated with conventional dispensers which are made of non-conductive materials.

- Suited for use in clean rooms
- Polished stainless steel
- Accepts tape rolls up to 2" wide
- Accepts tapes on either 1" or 3" cores
- Unit is shipped with 3" antistatic drum



P/N	Description	Each
620	ESD tape dispenser	\$69.40
80-6109-1027-9	Optional 1" antistatic drum	5.95

### BOTRON ESD-Awareness Floor Tape

This bright yellow and black vinyl-coated floor tape repeats its warning message every 12", making it a very versatile product.

- Long-lasting, heavy-duty, self-adhesive tape with release paper for easy installation
- Emphasizes static awareness throughout the plant
- 3" x 36 yd



P/N	Description	Each
M-34815	ESD-awareness tape	\$44.15

### DESCO Labels

These pressure-sensitive labels are designed to call immediate attention to items that are susceptible to damage from ESD.

- Permanent or re-usable



P/N	Size	Adhesive	Qty/Pkg.	9	19	20+
<b>Label with MIL-STD-129J Symbol</b>						
6727	2" x 2"	Permanent	500	\$8.80	\$7.70	\$7.20
6729	5/8" x 2"	Permanent	500	5.75	5.00	4.70
6728	4" x 4"	Permanent	250	16.40	14.40	13.45
<b>Label with RS-471 Symbol</b>						
6734	5/8" x 2"	Permanent	500	5.75	5.00	4.70
6735	2" x 2"	Permanent	500	8.80	7.70	7.20
6735S	2" x 2"	Permanent Spanish	500	8.80	7.70	7.20
6736	4" x 4"	Permanent	250	16.40	14.40	13.45
6736S	4" x 4"	Permanent Spanish	250	16.40	14.40	13.45
6730	2" x 2"	Re-usable	500	8.80	7.70	7.20
<b>Sign</b>						
6743	Area "WARNING" sign, 17" x 22" (5/Pkg)		\$22.60	\$19.85	\$18.40	
6742	Area "WARNING" sign, 17" x 22" (5/Pkg)		22.60	19.85	18.40	
6745	"ATTENTION" sign, 4" x 10", black on yellow, RS-471		2.90	2.60	2.45	
6745S	"ATTENTION" sign, Spanish, 4" x 10", black on yellow		2.90	2.60	2.45	
6746	Bench sign, 1" x 6", black on yellow, RS-471		.85	.75	.70	

### DESCO Sheet Protectors

- Sheet protectors designed to hold documents in ringed binders
- Shop travelers designed for use in the production environment as a route or work-order holder
- Made from 3-mil or 6-mil amino-free, static-protective, clear film
- Surface resistance is 10" Ω



P/N	Description	1-99	100-499	500+
7450	8-1/2" x 11" sheet protector, 3 mil	\$65	\$55	\$50
7451	12" x 10" shop traveler, 3 mil	1.10	1.05	1.00
7452	12" x 10" shop traveler with pocket, 3 mil	1.25	1.15	1.00
7470	8-1/2" x 11" sheet protector, 6 mil	1.35	1.20	1.10

**FAX** We accept fax orders 24 hours a day, 7 days a week.

### TEXWIPE® ESD WIPE™

This is a static-dissipative wiper for ESD-sensitive electronics manufacturing. Constructed of a 100% continuous-filament, no-run knitted nylon, it is uniquely suited for dry use in clean-room environments.

- 100% synthetic, knitted nylon
- No blooming or topical antistatic agents
- 100 wipers/bag, 5 inner bags of 20 wipers

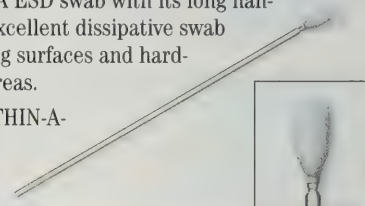


P/N	Description	Each
TX4025	ESD wipe, 9" x 9", 100/bag	\$83.00

### TEXWIPE ALPHA™ ESD Swab

The ALPHA ESD swab with its long handle is an excellent dissipative swab for cleaning surfaces and hard-to-reach areas.

- BAG-WITHIN-A-BAG™, 100 swabs/bag

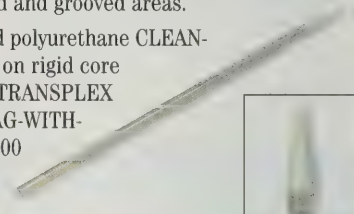


P/N	Description	Each
TX761D	ALPHA ESD swab with long handle, 100/bag	\$20.85

### TEXWIPE Mini Compressed CLEANFOAM® ESD Swab

This is an excellent dissipative swab for cleaning small slotted and grooved areas.

- Laundered polyurethane CLEAN-FOAM head on rigid core
- ESD-safe TRANSPLEX handle
- BAG-WITHIN-A-BAG, 500 swabs/bag



P/N	Description	Each
TX750E	CLEANFOAM ESD swab, 500/bag	\$51.25

### TEXWIPE TRANSPLEX™ Clipboard Kit

This large TRANSPLEX clipboard kit is the cleanest way to record information in electronic clean-room environments. It is reusable, ESD-safe, and molded of TRANSPLEX, (a dissipative plastic alloy), and features a TEXWRITE® MP 8 refill and TEXWRITE clean-room pen.

- 1.2 x 10<sup>9</sup> Ω surface resistivity\*
- ESD-safe, humidity-independent performance



P/N	Description	Each
TX5888	Clipboard kit with 20-sheet refill and clean-room pen	\$35.00
TX5891	Large TRANSPLEX clipboard only	25.65
TX5883	MP 8 paper refill, college ruled, 5-hole punched, 20 reams/case	141.65
TX5825	TEXWRITE clean-room pen, black, 12/box	32.25



# 3M ESD-Awareness Training Program



*Electrostatic discharge (ESD) is a serious threat to your valuable electronic products and equipment. Even though you may already be using a wide variety of static-control products in your facility, their effectiveness can be compromised if your employees are not adequately trained in ESD awareness and static control.*

The new 3M 7308 CD-ROM ESD-awareness training program offers you a cost-effective state-of-the-art multimedia tool for bringing the basics of static-electricity theory and practice directly to each employee. The computer-based program is self-administered and self-paced, using advanced CD-ROM technology that combines video, audio, animation, and graphics for an enjoyable learning experience. The program is ideal for certifying and later recertifying each employee's level of ESD awareness.

The 3 learning modules address the key aspects of ESD awareness and control: (1) Basic Static-Electricity Concepts, (2) Damage to Static-Sensitive

Devices, and (3) Static-Control Measures. The complete training package includes the CD, installation instructions, and separate manuals for the student and the administrator.

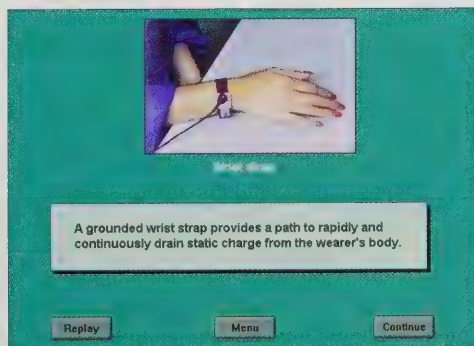
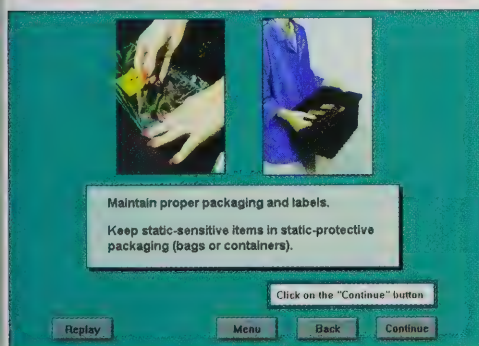
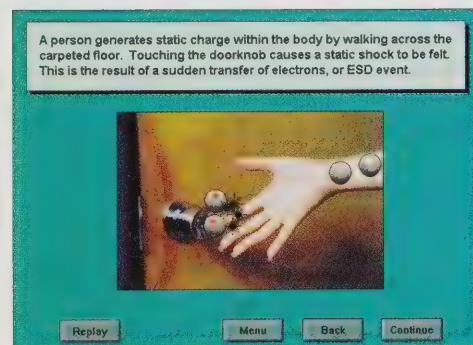
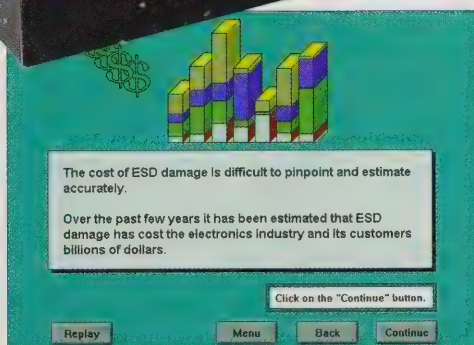
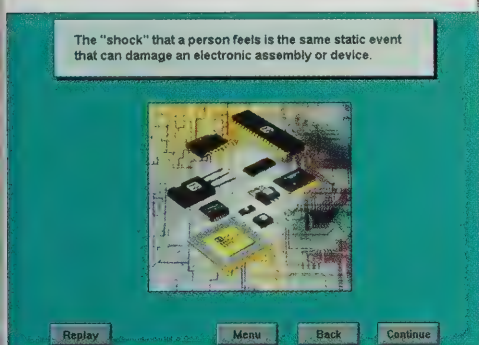
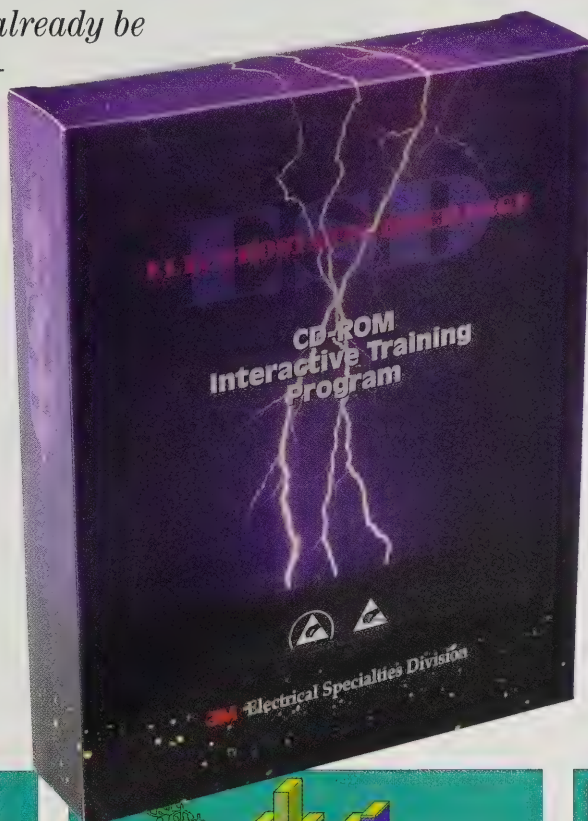
- Multisite licenses are available for companies wishing to load the program onto their in-house network—call for more information
- Spanish-language version available

## Technical Specifications

- Complies with EIA-625 and MIL-STD-1686
- Developed to strict INSTRUCTIONAL SYSTEMS DEVELOPMENT STANDARDS
- Includes self-installing run-time program, video, graphics, and sound files
- Includes administrator's guide and student's guide
- Provided in CD-ROM format

## System Requirements

- 486 IBM-compatible computer with CD-ROM player (or auxiliary CD-ROM player)
- 8 MB of RAM
- SVGA video, 256 colors, and 640 x 480 resolution
- Approximately 15 MB of hard-disk space
- WINDOWS 3.1 or higher
- SOUND BLASTER-compatible sound board recommended, but not required



The new 3M 7308 CD-ROM interactive multimedia ESD-awareness training program uses advanced video, audio, and graphics in guiding a student through the course. With a click on the mouse, the student can move forward or backward, seek additional information, or study specific examples. The screens depicted here are typical of those found throughout the training.

P/N	Description	Each
7308	ESD-awareness training program, English	\$675.00
7309	ESD-awareness training program, Spanish	675.00



## CHARLESWATER Field-Service Kit

This kit provides a static safe workstation for the field technician during service calls. The wrist strap provides an effective and safe means of drawing static charges from personnel. The grounded vinyl mat provides a static-safe work surface.

- 18" x 22" laminated-vinyl, 18 mil red mat
- With canvas carrying pouch
- Includes common point ground cord



P/N	Description	1-4	5-9	10+
16475	Field-service kit	\$53.70	\$48.95	\$43.70

## 3M Portable Field Service Kits

The 3M 8501 portable field service kit provides effective static protection in a compact package for the electronics field technician. The entire kit folds to a size that fits easily into most tool cases. Two pockets sewn into the work surface provide storage for the cords.

The 8505 is a small, lightweight version of the kit that comes with the same level of static control as the full-sized kit, yet is small enough to fit in a shirt pocket.



P/N	Description	1-4	5-9	10+
8501	Portable field-service kit	\$56.40	\$51.95	\$48.20
8505	Lightweight portable field-service kit	\$9.00	\$5.40	\$1.70

## CHARLESWATER Static-Dissipative Clipboard

This static-dissipative clipboard is used to hold documents in static-sensitive areas. It is constructed from MICASTAT®, a dissipative hard laminate. With its durable and attractive ESD-control surface, this clipboard is ideal for use during production, repairs, and audits.

- RTG: <3.0 x 10<sup>8</sup> Ω per ANSI EOS/ESD-S4.1
- Color: blue
- Dimensions: 9" x 12-1/2" x 1/8" thick



P/N	Description	1-9	10+
12700	Clipboard, static-dissipative	\$22.45	\$21.15

## CORSTAT Drawer Cabinet

The CORSTAT drawer cabinet is the most economical method available for storing a variety of small components at the workstation. The rigid double-walled cabinet contains 5 conductive thermoformed drawers with 10 cells per drawer. Each cell is 3" x 1.5" x 1". All components are made from the highest-quality conductive materials to comply with your static-control program.

- Store up to 50 different components per cabinet
- Economical
- Static protection
- Dimensions: 10-3/16" x 7-3/8" x 7-3/4"



P/N	Description	Each
DC1230	CORSTAT drawer cabinet	\$32.80

## R&R ESD-Safe Bottles and Containers

R&R LOTION has developed a new process for molding polyethylene bottles from a concentrate that does not contain ethoxylated tertiary amine, which is widely used as an antistatic agent. These ESD-safe bottles have an average surface resistivity of 10<sup>9</sup> to 10<sup>10</sup> and they do not have the less desirable features associated with surfactant-laden materials. The bottles can dissipate a charge of ±5,000 V in less than 2 s at 40% RH.



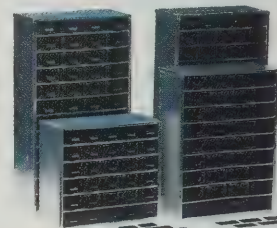
P/N	Description	1-99	100+
FD-1-ESD	2-oz flux bottle with 26-ga needle	\$3.65	\$3.45
FD-2-ESD	2-oz flux bottle with 20-ga needle	3.65	3.45
SD-6-ESD	6-oz solvent container with pump	12.15	11.30
WB-8-ESD	8-oz water bottle	4.30	3.95
SB-32-ESD	32-oz sports bottle	7.50	7.00
CTAL-ESD	16-oz catch-all container	3.45	3.20



## FLAMBEAU Conductive Cabinets

FLAMBEAU's conductive cabinets are built in accordance with the guidelines of DOD-HDBK-263 to bleed off any static charge at a safe, controlled rate when properly connected to a ground. Each cabinet comes with a static-safe ground wire which protects users against electrical shock. If the cabinet is on a table that is electrically conductive or grounded, the cabinet's ground wire may be left off.

FLAMBEAU's metal-frame cabinets with welded shelf construction provide a solid unit for your electrical components. All drawers and dividers are molded of carbon-filled conductive plastic. The metal cabinets are available in seven multi-compartment styles.



## Metal-Frame Conductive Storage Cabinets

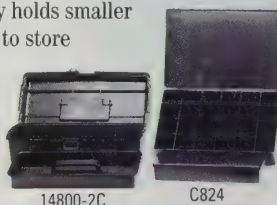
P/N	Cabinet Size	Number of Drawers	Divider Number	1-9	10+
3000C	16-1/2" x 12" x 5-3/4"	36	6781CD	\$76.15	\$63.45
3024C	21-7/8" x 12" x 5-3/4"	24	6783CD, 6782CD	87.20	72.65
3030C	11-1/4" x 12" x 5-3/4"	30	6780CD	66.25	55.20
3048C	21-7/8" x 12" x 5-3/4"	48	6781CD	87.20	72.65
3060C	21-7/8" x 12" x 5-3/4"	60	6780CD	87.20	72.65

## Conductive Dividers

P/N	Dimensions	Qty./Pkg.	1-9	10+
6780CD	1-3/8" x 2"	24	\$3.20	\$2.65
6781CD	1-3/8" x 2-1/2"	24	3.75	3.10
6783CD	2-1/4" x 3-1/8"	24	4.00	3.35
6782CD	2-1/4" x 5-5/16"	12	4.80	4.00

## FLAMBEAU Conductive Storage Boxes

The 14800-2C conductive storage box is designed for maximum strength, yet is lightweight with a comfortable full-grip handle and plenty of carrying space for hardware and tools. Its handy lift-out tray conveniently holds smaller items, leaving space to store larger items in the lower well. The 14800-2C is molded from carbon-filled hi-impact material.



P/N	Description	Dimensions	1-9	10+
14800-2C	14" storage box	14-1/2" x 7-1/2" x 5-1/4"	\$23.45	\$19.95

Conductive boxes are available in multi-compartment styles. These carbon-filled, high-impact plastic boxes are ideal for storage and transporting static-sensitive parts.

P/N	Number of Compartments	Dimensions	1-19	20+
C618	18	11" x 6-3/4" x 1-3/4"	\$20.45	\$18.60
C824	24	13-1/8" x 9" x 2-5/16"	30.70	27.90



**CHARLESWATER**

**WRIST STRAPS  
FOOT GROUNDERS  
SHIELDING BAGS**



**FLOOR GROUNDING IONIZATION  
WORK SURFACE GROUNDING  
TEST EQUIPMENT**

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[www.4atonce.com](http://www.4atonce.com) or call 800-261-9602 Ext.4002



## CLEAN ESD Latex Gloves

These ambidextrous clean-room latex gloves are low in particulates and extractables. Made from 100% natural latex for extra strength, these gloves are tear-resistant and provide excellent fingertip dexterity. Available in small, medium, large, and extra-large.

- Antistatic version available



LPF82

P/N	Description	1-9	10+
LPF82	9" clean-room ambidextrous latex gloves, 100/bag	\$9.95	\$7.95
LPF120	12" clean-room ambidextrous latex gloves, 100/bag	13.85	11.85
LPA104	9" clean-room antistatic latex gloves, 100/bag	15.00	12.85

## CLEAN ESD Class-100 Latex Gloves

Class-100 ambidextrous latex gloves start out with the same high-quality features as our standard latex. Extremely low in extractables with excellent fingertip sensitivity, these gloves are processed in a Class-100 clean room using a vector air flow and deionized water wash. Available in small, medium, large, and extra-large.

- Antistatic version available

P/N	Description	1-9	10+
LPC101	9" Class-100 clean-room ambidextrous latex gloves, 100/bag	\$15.00	\$12.85
LPC121	12" Class-100 clean-room ambidextrous latex gloves, 100/bag	18.35	15.75
LCA104	9" Class-100 clean-room antistatic-latex gloves, 100/bag	20.00	17.15

## CLEAN ESD Full-Fashion Stretch-Nylon Gloves

This medium-weight nylon glove features traditional styling with an inset thumb and between-finger stitching for a more tailored fit. This glove is commonly used as an inspection glove to prevent skin oils from contaminating manufactured parts. This is not an ESD protective glove.

P/N	Description	1-9	10+
1FM	9" men's, full-fashion, stretch nylon; 12 pair/bag	\$15.00	\$12.85
1FW	9" women's, full-fashion, stretch nylon; 12 pair/bag	15.00	12.85

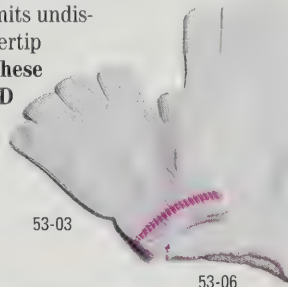


1FW

1FM

## CLEAN ESD Nylon Glove Liners

A revolutionary new knitting process allows these gloves to absorb perspiration just as well as cotton gloves. The partial-finger design permits undisturbed fingertip dexterity. These are not ESD protective gloves.



53-03

53-06

P/N	Description	Each
53-03	Half-finger, absorbing glove liner, 12 pair/bag	\$18.35
53-06	Full-finger, absorbing glove liner, 12 pair/bag	18.35

## OAK TECHNICAL Vinyl Gloves

This glove and packaging were developed to meet the needs of the electronic and micro-electronic markets, which require a packaged vinyl glove that can be processed directly into a Class-100 clean room without additional cleaning.

- Chloride- sodium- and sulfur-free • Test data on one million processed gloves indicates particulate counts to be significantly reduced • Less than 10 particles 5 microns or greater • Less than 20 particles 3 microns or greater • This glove is a positive barrier to contamination • Also available in a long-length antistatic version • Packaging: 100 gloves in a sealed static-shielding blue poly bag.



96-335

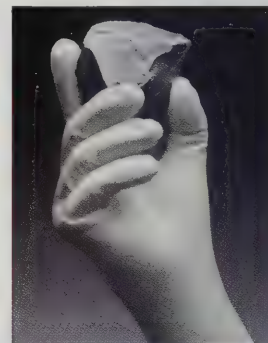
P/N	Description	Each
96-135	Class-100, powder-free, small	\$23.00
96-235	Class-100, powder-free, medium	23.00
96-335	Class-100, powder-free, large/X-large	23.00
96-133	Long-length, antistatic, Class-100, powder-free, small	26.00
96-233	Long-length, antistatic, Class-100, powder-free, medium	26.00
96-333	Long-length, antistatic, Class-100, powder-free, large/X-large	26.00

## ANSELL EDMONT NYTEK High-Tech Nitrile Gloves

- Unsupported, solvent-resistant • 100% powder-free nitrile • Abrasion- and snag-resistant • Complete lot traceability • 9 mil, 13.8" length, bisque finish • Straight cuff • Specially packaged to maintain contaminant-free integrity



49-155



P/N	Description	Dozen Pairs
49-155-7	White nitrile gloves, size 7	\$34.20
49-155-8	White nitrile gloves, size 8	34.20
49-155-9	White nitrile gloves, size 9	34.20
49-155-10	White nitrile gloves, size 10	34.20

NOTE: Packed 1 pair per polypouch, 12 polypouches per bag.

## ANSELL EDMONT NITRILITE® Gloves

NITRILITE gloves solve many of the contamination problems caused by vinyl and latex in today's clean rooms. Compared to latex, NITRILITE offers significantly superior electrostatic-discharge (ESD) protection for many sensitive applications (such as disk-drive manufacturing) where the insulative characteristics of latex are typically unacceptable. NITRILITE gloves are designed for maximum dexterity and flexibility.

- Contain no proteins or allergens • Clean-room compatible • Tear resistant • 4 mil, 12" length, rolled cuff • 100 gloves per poly bag



93-112

P/N	Description	Each
93-112-XS	NITRILITE, size 5 to 5-1/2	\$21.50
93-112-S	NITRILITE, size 6 to 6-1/2	21.50
93-112-M	NITRILITE, size 7 to 7-1/2	21.50
93-112-L	NITRILITE, size 8 to 8-1/2	21.50



We provide telephone technical assistance with your purchases.



We accept fax orders 24 hours a day, 7 days a week.



## Clean ESD Garments

These garments are made of DUPONT TYVEK® which is low-linting and provides contamination protection in clean-room environments. It is water-repellent and guards against certain hazardous or toxic materials. Non-contaminated TYVEK garments can be recycled or cleanly incinerated.

- Available in small, medium, large, and extra-large



P/N	Description	1-9	10+
T840NE	Standard coverall, 25/case	\$133.25	\$99.95
T840U	Coverall with elastic wrist and ankle, 25/case	146.60	109.95
T09	TYVEK frock with elastic wrist, snap front, 30/case	126.25	117.80
T807	18" sleeves, 100 pr/case	79.05	73.80

## Clean ESD Bouffant-Style Caps

Here is an economical, disposable, spun-bonded bouffant-style cap. It is low-linting, flame-retardant, nonwoven, and provides excellent head coverage for assemblers.

- Flame-retardant • Low-linting • Nonwoven • Soft

P/N	Description	Each
BC201-21	White, large (21"), 1,000/case	\$65.00

## Clean ESD Beard Cover

The BC214 beard cover is made from soft, nonwoven, spun-bonded polypropylene. It slips on comfortably and is secured with an elastic back.

- Meets OSHA and FDA standards • Comfortable • Flame-retardant

P/N	Description	1-9	10+
BC214	Beard cover, 100/bag	\$8.00	\$6.85

## Clean ESD Shoe Coverings

Shoe covers are made of soft nonwoven, disposable materials, constructed with elastic at ankle and can comfortably fit over shoes.

P/N	Description	Each
804	Bootie, uni-size, spunbonded polypropylene, 500 pr/case	\$89.30
803	Bootie with nonskid bottom, uni-size, spun-bonded polypropylene, 150 pr/case	35.70
805	Bootie, conductive, uni-size, 150 pr/case	71.45
T06	TYVEK shoe cover, uni-size, 50 pr/case	59.25

## ANSELL EDMONT FRESH TOUCH™ Bouffant

The FRESH TOUCH bouffant is cleaner and neater in appearance than other bulk-packed products due to 1-touch flat packaging. The exclusive 1-touch packaging helps prevent contamination by dispensing 1 product at a time.



P/N	Description	Each
67-221/950513	White bouffant, 21", 100/pkg.	\$5.90
67-224/950516	White bouffant, 24", 100/pkg.	6.95

## ANSELL EDMONT Coat Apron

This coat apron is the first to eliminate the contaminants of sewing, exposed elastic, and thread while also removing the major problem of leaks. Additional problems like stitching that acid can eat through, and metal parts that cause static and corrosion, have been eliminated. This is the perfect product for the electronics industry, offering protection without the drawbacks found in other coat aprons.



56-906-S

P/N	Description	Each
56-906-S	Small, blue, 6-mil coat apron	\$13.00
56-906-M	Medium, blue, 6-mil coat apron	13.00
56-906-L	Large, blue, 6-mil coat apron	13.00

## R&R IC Clean-Room Lotion

This new hand lotion is especially formulated for the clean-room environment. It is non-acidic and is enriched with aloe vera and vitamin A, D, and E to achieve healthier, softer, younger-looking hands. This static-free lotion helps to eliminate skin flaking, as well as achieving better contact between the wrist strap and skin.

- No fragrance, glycerin, or dye
- No mineral oil, silicone, or lanolin



ICL-16-CR-ESD ICL-8-CR ICL-GAL-CR

P/N	Description	Each
ICL-8-CR	8 oz, lotion	\$2.90
ICL-8-CR-ESD	8 oz, lotion, ESD bottle	4.30
ICL-16-CR-ESD	16 oz, lotion, ESD bottle with pump	7.85
ICL-GAL-CR	Gal, lotion, refill	32.50

## TECH SPRAY Wipers

The Techclean™ wiper is specifically designed for clean-room maintenance. This hydroentangled, cellulose/polyester wipe has high absorbency with extra-low particulate and chemical extractables.

The Techclean Ultrawipe is a patterned, hydroentangled, cellulose/polyester wipe designed with a unique textured pattern that enhances the effectiveness of the wipe by providing a place for the contaminants to hide.

The Techclean Purwipes have a 100% continuous-filament polyester fiber in an interlocking knit for super-high absorbency, low particulate generation, and high durability.



P/N	Description	Each
2350-100	Techclean, 9" x 9" C-fold wipes, 100/bag	\$14.35
2353-100	Techclean Ultrawipe, 9" x 9" flat wipes, 100/bag	22.40
2354-100	Techclean Ultrawipe, 12" x 12" flat wipes, 100/bag	37.15
2355-100	Techclean Purwipes 9" x 9" flat wipes, 100/bag	26.75

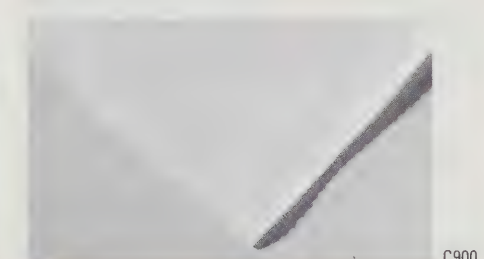
## CHEMTRONICS WIPES

CONTROLWIPES™ are a solvent-resistant, high-absorbency, liquid-retention wipe. They are safe for critical applications requiring excellent contamination control such as precision instruments.

- Packaged in a Class-100 clean-room environment • Polyester cellulose blend

TWILLWIPES™ are highly absorbent and abrasion-free for cleaning and drying sensitive surfaces, components, and equipment.

- Strong textured cotton • Minimal linting
- Resistant to caustic solvents and temperatures up to 150 °F



C900

P/N	Description	1-24	25+
C910	Controlwipes, 9" x 9", 150 wipes	\$23.50	\$22.00
C900	Twillwipes, 9" x 9", 150 wipes	52.25	48.85
C600	Twillwipes, 6" x 6", 300 wipes	51.80	48.40



## CHEMTRONICS Clean-Room Polywipes

These are high-strength general-purpose clean-room wipes.

- Packaged in a Class-1 clean-room environment
- High-strength light-weight polyester fabric
- Low ionic, nonvolatile residue and particle contaminants
- Compatible with most solvents
- For clean-room surface cleaning and maintenance of controlled areas



P/N	Description	1-12	13-24	25+
C440CR	Polywipes, 4" x 4", 300/box	\$28.90	\$27.00	\$25.20
C990CR	Polywipes, 9" x 9", 150/box	55.80	52.15	48.65

## COVENTRY Poly-Wipes

This is a durable clean-room workhorse.

- Class-10 to Class-1000 applications
- Wafer fabrication cleanup and maintenance
- Polyester monofilament fiber builds in high strength
- Class-M1 processing produces the lowest ionic, nonvolatile residue and particle contaminants
- Compatible with most common solvents such as isopropyl alcohol, FREON® TF, methanol, ketones, most acids, and weak bases



P/N	Description	Each
6209	Poly-wipes, 9" x 9", 150/bag	\$40.10

## COVENTRY™ Cotton Wipes

These cotton wipes are very absorbent and excellent for high-temperature applications.

- Excellent solvent, base, and dilute-acid resistance
- Low linting to help control contamination
- Cut on the bias to prevent edge raveling
- Withstand temperature extremes to 150 °C (302 °F)
- Processed in a Class-100 environment



P/N	Description	Each
6809	Cotton-twill wipe, 9" x 9", 300/bag	\$85.25

## COVENTRY™ CLEANROOM CHAMOIS™ Wipe

This wipe is super absorbent and its patented sealed-edge microfiber technology enables it to entrap sub-micron particles.

- Provides the most thorough removal of all solvents and contaminants
- Saves time—replaces 2-4 standard polyester wipes
- Superior strength allows it to be laundered and reused, saving even more money
- Processed in a Class-M1 clean room to provide the lowest amounts of ionic, non-volatile-residue, and particle contaminants
- Compatible with most acids and common solvents, weak bases, alcohols, and ketones
- 50/bag (2 inner bags of 25 each)



P/N	Description	Each
7320	CHAMOIS wipe, 8" x 8", 50/bag	\$102.40

## COVENTRY™ ECONOWIPES™

ECONOWIPES are absorbent, economical, nonwoven utility wipes, made of cellulose/polyester. Typical applications include:

- General-purpose wiping in controlled areas
- Wiping down machinery and instrumentation
- Cleaning laminar-flow benches
- Cleaning stencil screens in circuit-board production

- Excellent solvent and dilute-acid resistance
- Good ionic contamination properties
- Packaged in a Class-100 environment
- Compatible with most common solvents such as isopropyl alcohol, FREON® TF, methanol, and dilute acids—also good with ketones such as acetone and methyl ethyl ketone



P/N	Description	Each
6704	ECONOWIPES, 4" x 4", 1,200/bag	\$20.80
6709	ECONOWIPES, 9" x 9", 300/bag	16.55
6712	ECONOWIPES, 12" x 12", 150/bag	17.45
6736	ECONOWIPES, 36" x 36", 25/bag	42.05

## JNJ ULTRACLEAN SMARTWIPES®

Manufactured from 100% continuous-filament polyester fiber, these ULTRACLEAN wipes are soft, do not scratch, and become softer when wet—while maintaining high tensile strength. They are not affected by solvents and have a very low electrostatic discharge. These wipes are excellent for cleaning glass and ceramic surfaces, CDs, instruments, tools, and bottoms of printing screens. Unlaundered ULTRACLEAN wipes are 1 of JNJ's most popular and are widely used in screen-printing applications where lint-free cleaning is critical.

- #810 is rated Class-100 clean-room
- #031A is rated Class-1000 clean-room, unlaundered

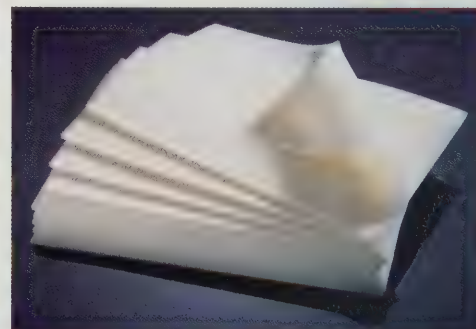


810

P/N	Description	Each
810	ULTRACLEAN wipes, 9" x 9", 150/bag, 5 bags/case	\$42.40
031A	ULTRACLEAN wipes, 9" x 9", 752/bag, 1 bag/case (unlaundered)	97.00

## JNJ Foam Wipes

These wipes are made from fully reticulated (open cell) polyurethane foam. They are 1/8" thick, white, durable, and reusable. The open-cell structure of these wipes traps dirt and soils including thick-film inks, greases, pastes, and epoxies and their high "sponge-like" properties make them excellent solvent applicators. Plus, their exceptionally low particle generation makes them ideal for clean-room applications.



443

P/N	Description	Each
443	Foam wipes, 6" x 9", 100/bag, 5 bags/case	\$112.90



## COVENTRY PILLOW-TIP™ Swab

The PILLOW-TIP is made from a clean-room-washed fabric that is formed into a unique solvent-retaining swab.

Typical applications include:

- Applying solvents and dyes
- Mopping critical areas of components
- Lint-free swabbing
- Cleaning components with acetone

- Excellent solvent, base, and dilute-acid resistance
- No-edge seamless design is lint free
- High-strength, durable head construction
- Fabric is processed in a Class-M1 clean room to yield low amounts of ionic, nonvolatile-residue, and particulate contaminants
- 0.23" head
- Glass-filled nylon handle



P/N	Description	Each
51121	PILLOW-TIP swab, 3" handle, 25/bag	\$9.55

## COVENTRY TUFF-WICK SWABS™

These durable wrapped foam swabs are designed for precise application of materials.

Typical applications include:

- Applying and removing adhesives or lubricants in tight-tolerance areas
- Cleaning fiber-optic splices and assemblies
- Removing contamination from disk-drive components
- Applying spot solvents to micro devices

- Strongest head of all foam swabs
- Fiberless construction prevents particulation
- Do not abrade the object being scrubbed
- Wicking action pulls solvents from surfaces
- Foam-over-cotton bud style provides larger solvent capacity
- 0.03" head
- Nylon tapered handle



P/N	Description	Each
21050	TUFF-WICK SWABS, 3" handles, 500/bag	\$77.95

## COVENTRY UTILITY SWABS™

These economical general-purpose swabs have the best solvent retention.

Typical applications include:

- Removing contamination from disk drives
- Cleaning up excess adhesives and lubricants
- Final cleaning of medical devices
- Cleaning all micro-mechanical devices

- 100-ppi polyurethane medical-grade foam
- Free of adhesives or binders that can contaminate your process
- Fiberless construction does not generate particles
- Foam-over-cotton bud style provides larger solvent capacity
- Available in the C-PRIME™ process for greater purity
- Wooden handles are good with all solvents except dilute acids
- Polypropylene handles are good with all solvents including dilute acids
- 0.14" head
- 0.40" foam-over-cotton head



P/N	Description	Each
41050	UTILITY SWABS, 2-3/4" polypropylene handles, 500/bag	\$31.60
43170	UTILITY SWABS, 6" wooden handles, 500/bag	62.10

## TECH SPRAY Clean-Room Brushes

- Bristle retention: hand-laced
- Handle is anodized aluminum, 6-1/2" long



	2040	2041	2042	2043
Bristle length	1-1/4"	1-1/4"	1-1/4"	1-1/4"
Bristle width	1/8"	1/8"	3/8"	3/8"
Bristle trim	7/16"	7/16"	7/16"	7/16"

P/N	Description	1-12	13-24	25+
2040-1	Clean-room brush, horsehair bristle	\$7.65	\$7.30	\$6.70
2041-1	Clean-room brush, ESD-safe, stainless steel bristle	8.20	7.80	7.10
2042-1	Clean-room brush, horsehair bristle	12.25	11.65	10.60
2043-1	Clean-room brush, ESD-safe, stainless steel bristle	13.40	12.75	11.60



We provide reduced pricing on large-quantity orders.



New Product: This symbol represents the industry's latest offerings.

## EckAdams BULLY™ Series Seating

This self-skinned urethane seating is specifically designed to stand up to the rigors of clean-room use.

- Lockable or free-floating back tilt
- Adjustable chrome footrest ring
- Chrome frame
- Black only
- Complies with ANSI/HFES 100-1988
- Meets or exceeds ANSI/BIFMA standards for strength, durability, and safety



3488

P/N	Description	Seat Height	1-9	10-19	20+
3478	Mid-height task chair	20-1/4"-27-3/4"	\$254.00	\$237.00	\$221.00
3488	Counter-height task chair	23"-33"	264.00	240.00	225.00

## 3M Clean-Walk Mats

Maintain clean-room standards with 3M-brand Clean-Walk Mats. These adhesive floor mats remove dirt and contaminants from shoe soles, wheels, and other passing objects on contact. When the top sheet is soiled, it can be peeled back to reveal a clean adhesive sheet underneath.

- Each mat includes 30 adhesive layers mounted on a 2-mil polyethylene backing to make it exceptionally long-lasting



5802

P/N	Description	1-4	5+
5800	18" x 36" clean-walk mat	\$105.40	\$98.45
5801	18" x 45" clean-walk mat	139.45	130.40
5802	24" x 45" clean-walk mat	185.95	173.75



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# It took 150 years to perfect this tool

## SANDVIK LINDSTROM

is copied by many but equaled by none, because with nearly 150 years of tool-making experience, it remains quality- and manufacture-driven.

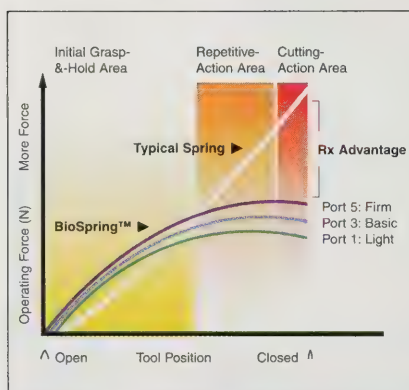
### LINDSTROM Quality

With the most advanced forgings, the use of carbon chrome ball-bearing steel, and a cutting-edge hardness (63-65 Rockwell C) unmatched by any other cutter, the SANDVIK LINDSTROM pliers and cutters are the epitome of quality and consistency. Each and every tool is identical to the next. Furthermore, the cutter outperforms any other on the market in the cost-per-cut equation—the true measure of value.

### Early Ergonomic Efforts

SANDVIK LINDSTROM's 80 Series cutters, introduced in 1977, was one of the first group of hand tools that utilized basic ergonomic concepts. In 1989 SANDVIK LINDSTROM entered into a joint venture with one of the world's largest telecommunications companies to explore the ergonomic requirements that are unique to electronics manufacturing. The result was the handle-option HANDSAVER which could be optimized for material, surface, curvature, length, and width. Today over 400 companies in the U.S. alone rely on the HANDSAVER.

**BIOSPRING™**—This gives you the ability to adjust the tool to your individual physical requirements. A vertical series of ports lets you choose the spread of the handles and tension of the spring. This same adjustment can be optionally used to preset the jaw/tip opening for similar repetitive work, and to reduce hand activity.



P/N	Description	A	B	Each
RX8130	Oval head mini cutter/micro bevel cut	5.25"	.31"	\$44.25
RX8131	Oval head mini cutter/flush cut	5.25"	.31"	46.00
RX8132	Oval head mini cutter/ultra flush cut	5.25"	.31"	51.50
RX8140	Oval head small cutter/micro bevel cut	5.25"	.31"	42.00
RX8141	Oval head small cutter/flush cut	5.25"	.31"	43.50
RX8142	Oval head small cutter/ultra flush cut	5.25"	.31"	49.00
RX8143	Tapered head small cutter/micro bevel cut	5.25"	.31"	45.25
RX8147	Tapered and relieved small cutter/flush cut	5.25"	.31"	47.75
RX8148	Tapered and relieved small cutter/ultra flush cut	5.25"	.31"	51.50
RX8149	Tip cutter/flush cut	5.25"	.55"	85.75
RX8150	Oval head medium cutter/micro bevel cut	5.50"	.49"	44.25

**The Rx Profile**—The profile of the Rx grip is slightly rounded and wide to provide the optimum amount of surface contact between the hand and the tool—giving the user much better control and making it more comfortable to use. Furthermore, the extended length of the handle allows it to override the sensitive median-nerve area of the palm—reducing the possibility of adverse neural, muscular, and epidermal conditions.

**Shift-To-Fit**—A simple shift-to-fit procedure allows you to customize the Rx to accommodate every conceivable hand size and strength.

1. Pull tool apart—spring disengages.
2. Press spring into desired port—spring snaps in place.

**STAT<sup>x</sup> Grips**—Because they are made of a dual-composition material, STAT<sup>x</sup> grips generate "feedback cushion control." This gives you better control of the tool because the grip construction prohibits the handle from becoming "spongy." The ESD-safe composition combines resins with conductive additives to produce grips that address both static-dissipation and EM/RFI-shielding issues.

## The Rx Advantage™

1. You can customize the tool's width.
2. You can adjust the amount of force required to operate the tool.
3. In the grasp-and-hold area, the force required is greater than with a typical spring. This gives you a safer, surer grip.
4. In the repetitive-action area, less force is needed than with a typical spring.
5. In the holding- or cutting-action area, much less force is needed. This helps to reduce the force required to hold or cut material.

**Micro-Touch Positioning™**—Micro-Touch Positioning enables you to maneuver the Rx head with micrometer precision—by using a rolling motion between the thumb and the index finger. No other pliers or cutters allow you to do this.



P/N	Description	A	B	Each
RX8151	Oval head medium cutter/flush cut	5.50"	.49"	\$46.00
RX8152	Oval head medium cutter/ultra flush cut	5.50"	.49"	51.50
RX8247	Oblique cutter/flush cut	5.50"	.71"	77.75
RX8248	Oblique cutter/flush cut	5.50"	.71"	81.50
RX7490	Flat nose/smooth jaw pliers	5.75"	.79"	38.00
RX7590	Round nose pliers	5.75"	.79"	41.50
RX7890	Chain nose/smooth jaw pliers	6.25"	1.26"	41.00
RX7891	Chain nose/serrated jaw pliers	6.25"	1.26"	41.25
RX7892	Bent nose/smooth jaw pliers	6.25"	1.14"	43.75
RX7893	Short chain nose/smooth jaw pliers	5.75"	.79"	41.50



## SANDVIK LINDSTROM 80 Series Oval-Head Diagonal Cutters

The 8130 mini MICRO BEVEL® is the smallest cutter in the industry that can cut 18-AWG wire.

8130

P/N	Description	A	B	Each
8130	Oval-head diagonal micro-bevel cutter	4.25"	.310"	\$39.25

The 8131 is the same as the 8130 except that it is flush-cutting.

8131

P/N	Description	A	B	Each
8131	Oval-head diagonal flush cutter	4.25"	.310"	\$41.00

The 8132 is an ULTRA FLUSH® cutter that can cut 20–38 AWG.

8132

P/N	Description	A	B	Each
8132	Oval-head diagonal ultra-flush cutter	4.25"	.310"	\$46.50

• Small MICRO BEVEL • Maximum cutting capacity: copper wire up to 16 AWG and .023 iron wire

8140

P/N	Description	A	B	Each
8140	Oval-head diagonal micro-bevel cutter	4.33"	.390"	\$37.00

• Small flush-cut • Maximum cutting capacity: copper wire up to 16 AWG

8141

P/N	Description	A	B	Each
8141	Oval-head diagonal flush cutter	4.33"	.390"	\$38.50

• Small ULTRA-FLUSH cut • Maximum cutting capacity: copper wire up to 16 AWG

8142

P/N	Description	A	B	Each
8142	Oval-head diagonal ultra-flush cutter	4.33"	.390"	\$44.00

## SANDVIK LINDSTROM 80 Series Tapered- and Relieved-Head Diagonal Cutters

• For assembly work where accessibility is a consideration • Small flush-cut tool for copper wire up to 18 AWG

8147

P/N	Description	A	B	Each
8147	Tapered- and relieved-head diagonal flush cutter	4.33"	.390"	\$42.75
8148	Tapered- and relieved-head diagonal ultra-flush cutter	4.33"	.390"	\$46.50

• Medium MICRO BEVEL • Maximum cutting capacity: copper wire 14 AWG, stainless .016"

8150

P/N	Description	A	B	Each
8150	Oval-head diagonal micro-bevel cutter	4.43"	.490"	\$39.25

• Diagonal flush cutter  
• Cuts 14–32 AWG

8151

P/N	Description	A	B	Each
8151	Oval-head diagonal flush cutter	4.43"	.490"	\$41.00

• Large MICRO BEVEL • Maximum cutting capacity: copper wire up to 12 AWG and .016 piano wire

8160

P/N	Description	A	B	Each
8160	Oval-head diagonal micro-bevel cutter	4.92"	.630"	\$41.00

## SANDVIK LINDSTROM Oblique Cutters

The 8247 is a medium, 45°-angle flush cutter with a maximum cutting capacity of 18-AWG copper wire.

8247

P/N	Description	A	B	Each
8247	Oblique cutter	4.63"	.710"	\$72.75

The 8248 is the same as the 8247 except that it has a slimmer head and cuts wire up to 20 AWG.

8248

P/N	Description	A	B	Each
8248	Oblique flush cutter	4.63"	.710"	\$76.50



*New Product: This symbol represents the industry's latest offerings.*



## SANDVIK LINDSTROM HANDSAVER Series Oval-Head Cutters

SANDVIK LINDSTROM HANDSAVER tools meet every ergonomic criterion. When used as part of a comprehensive ergonomic program, these tools can play an important role in:

- Improving the health and safety of the work force
- Improving the quality of the end products
- Reducing costs of risk management
- Reducing absenteeism

### HANDSAVER MICRO-BEVEL® Cutter

- Cuts 16–32 AWG
- Leaves minimal rise on cut leads

HS8140



P/N	Description	A	B	Each
HS8140	MICRO-BEVEL cutter	5.7"	.390"	\$47.00

### HANDSAVER Flush-Cutter

- Cuts 16–38 AWG
- Leaves smallest lead end

HS8141



P/N	Description	A	B	Each
HS8141	Flush-cutter	5.7"	.390"	\$48.50

### HANDSAVER Small ULTRA-FLUSH® Cutter

- Excellent for military applications
- Cuts up to 16 AWG

HS8142



P/N	Description	A	B	Each
HS8142	ULTRA-FLUSH cutter	4.33"	.390"	\$54.00

### HANDSAVER MICRO-BEVEL Cutter

- Smallest cutter available for 14 AWG copper, cuts .018" stainless steel

HS8150



P/N	Description	A	B	Each
HS8150	MICRO-BEVEL cutter	4.5"	.490"	\$49.25
HS8160	MICRO-BEVEL cutter	4.95"	.630"	\$1.00

### HANDSAVER Flush-Cutter

- Leaves smaller bevel, good for commercial and military applications
- Cuts 14–32 AWG

HS8151



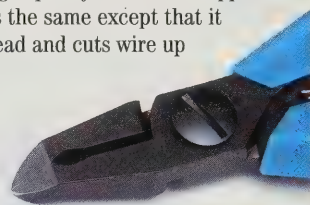
P/N	Description	A	B	Each
HS8151	Flush cutter	4.43"	.490"	\$51.00

### HANDSAVER Oblique Flush-Cutters

This is a medium, 45°-angle flush-cutter with a maximum cutting capacity of 18-AWG copper wire. The 8248 is the same except that it has a slimmer head and cuts wire up to 20 AWG.

- Excellent for high-density, deep-cavity areas

HS8247



P/N	Description	A	B	Each
HS8247	Cuts 18-32 AWG	4.63"	.710"	\$82.75
HS8248	Cuts up to 20 AWG	4.63"	.710"	\$86.50

NOTE: Any pliers or cutters in the SANDVIK LINDSTROM line can be ordered with HANDSAVER static-dissipative grips.

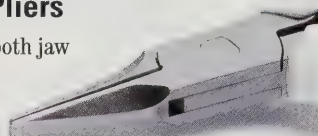
- Features include:
- Comfortable, ESD-safe handles
  - Moderate-pressure spring returns
  - Minimum friction, precision screw joints
  - Extremely sharp and durable cutting edges

You must use the prefix HS with the part number when ordering (e.g., HS7490). Add \$10.00 per tool.

### SANDVIK LINDSTROM Flat-Nose Pliers

- Box joint, smooth jaw

7490

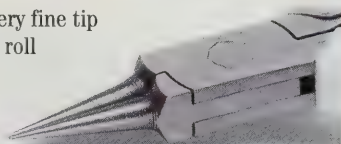


P/N	Description	A	B	Each
7490	Flat-nose pliers	.72"	.790"	\$33.00

### SANDVIK LINDSTROM Round-Nose Precision Pliers

- Box joint, very fine tip
- Reduce jaw roll

7590



P/N	Description	A	B	Each
7590	Round-nose precision pliers	4.72"	.790"	\$36.50

### SANDVIK LINDSTROM 70 Series Chain-Nose Precision Pliers

- Box joint
- Smooth jaws
- Radiused edges
- No jaw roll

7890



P/N	Description	A	B	Each
7890	Chain-nose, precision pliers	5.2"	1.26"	\$36.00

### SANDVIK LINDSTROM Serrated Chain-Nose Pliers

- Box joint
- Serrated jaws
- Squared ends
- Firm gripping

7891

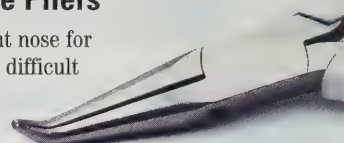


P/N	Description	A	B	Each
7891	Chain-nose pliers	5.2"	1.26"	\$36.25

### SANDVIK LINDSTROM Bent-Nose Pliers

45°-angle bent nose for reaching into difficult areas

7892



P/N	Description	A	B	Each
7892	Bent-nose pliers	5.08"	1.14"	\$38.75

### SANDVIK LINDSTROM Chain-Nose Pliers

- Short chain nose
- Box joint
- Smooth jaw, yet has firm grip

7893



P/N	Description	A	B	Each
7893	Chain-nose pliers	4.72"	.79"	\$36.50

### SANDVIK LINDSTROM ESD Sleeves

ESD sleeves are available for almost all SANDVIK LINDSTROM pliers and cutters. Order by using the desired code as a prefix to the part number (for example ST8142). Add \$3.00 per tool.

Code	ESD	Range	Description
AS	10 <sup>9</sup>	-10 <sup>12</sup>	Antistatic
ST	10 <sup>6</sup>	-10 <sup>9</sup>	Static-dissipative
CD	10 <sup>1</sup>	-10 <sup>6</sup>	Conductive



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We provide world-class quality ISO-9002-certified services and facilities.



### ALTIMA BY EXCELTA®-MYSTIC LINE™ High-Performance Tapered-and Relieved-Head Maximum Full- Flush TIP-O-DYKE™ Cutter

- Small full-flush cutter for use in areas with limited access • Cuts smaller soft wire up to 24 AWG
- Narrow profile for deep access • Made in USA

7270E

P/N	Description	A	B	1-9	10-24	25+
7270E	Full-flush cutter	4-1/2"	.900"	\$72.10	\$66.10	\$63.10

### ALTIMA BY EXCELTA-MYSTIC LINE High-Performance Angulated Maximum-Full-Flush TIP-O-DYKE Cutter

- Ideal for module work • Provides maximum visibility • Blades operate either vertically or horizontally • Use for cutting .010-.030 nickel ribbon and smaller soft wire up to 22 AWG • Made in USA

7282E

P/N	Description	A	B	1-9	10-24	25+
7282E	Full-flush cutter	4-3/4"	.700"	\$70.90	\$65.00	\$62.05

### ALTIMA BY EXCELTA-MYSTIC LINE FINE Small Oval-Head Optimum-Full-Flush Cutter

- For extremely fine cutting applications • Cuts up to 20 AWG-soft wire
- Made in USA

7211E

P/N	Description	A	B	1-9	10-24	25+
7211E	Full-flush cutter	4-1/2"	.530"	\$64.30	\$58.95	\$56.25

### OPTIMA BY EXCELTA-MYSTIC LINE SUPER-FINE Tapered-and- Relieved Small-Head Maxi- mum-Full-Flush Cutter

- For use in high-density areas
- Cuts up to 20 AWG-soft wire

776EI

P/N	Description	A	B	1-9	10-24	25+
776EI	Small-head maximum, full-flush cutter	4-1/2"	.530"	\$52.05	\$47.70	\$45.55

### EXCELTA CLASSICS 9100 Series Semi-Flush Oval-Head Cutters

- For use where a full-flush cut is not needed

9140

P/N	Description	Cutting Capacities	A	B	1-9	10-24	25+
9140	Semi-flush cutter	32-16 AWG	4-1/2"	.420"	\$31.45	\$28.85	\$27.55
9150	Semi-flush cutter	30-14 AWG	4-3/4"	.520"	33.20	30.40	29.05
9160	Semi-flush cutter	26-12 AWG	5-1/4"	.600"	35.50	32.55	31.05

### EXCELTA CLASSICS 9100 Series Oval-Head Cutters

- Low cost, general purpose full flush-cut • Cuts 16-32 AWG

P/N	Description	Cutting Capacities	A	B	1-9	10-24	25+
9141	Ultra-fine, full-flush cutter	32-16 AWG	4-1/2"	.420"	\$33.25	\$30.50	\$29.10
9151	Fine, full-flush cutter	30-14 AWG	4-3/4"	.520"	35.50	32.55	31.05
9161	Full-flush cutter	26-12 AWG	5-1/4"	.600"	36.35	33.30	31.80

9141

### ALTIMA BY EXCELTA 7100 Series Cutters with Long Ergonomic Handles

- Comes standard with long ergonomic handles
- Cutting edges hardened to 63-65 RC • Available in semi-flush, maximum-flush, and optimum-flush • Precision-matched screws/lap joint for superior alignment
- Made in USA



7140E

P/N	Description	A	B	1-9	10-24	25+
7140E	Semi-flush, oval head, cuts .010-.044"	5-1/4"	3/8"	\$47.15	\$43.20	\$41.25
7141E	Maximum-flush, oval head, cuts .008-.044"	5-1/4"	3/8"	48.95	44.85	42.85
7142E	Optimum-flush, oval head, cuts .005-.025"	5-1/4"	3/8"	56.50	51.80	49.45

### EXCELTA CLASSICS-LAVENDER LINE™, MICROMADIUM®, Ultra-Fine Relieved-Head Maximum-Full-Flush Cutter

- Designed for extremely fine cutting applications
- Cuts wire up to 24 AWG

76EI

P/N	Description	A	B	1-9	10-24	25+
76EI	Ultra-fine relieved-head cutter	4"	.472"	\$33.50	\$30.70	\$29.30

EXCELTA®



### EXCELTA CLASSICS-LAVENDER LINE PRIMADIUM® Medium- Sized Tapered-Head Maximum Full-Flush Cutter

- Tapered jaw allows cutting in areas with limited access
- Cuts wire up to 20 AWG

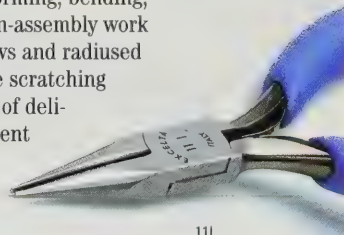


86EI-4.75

P/N	A	B	1-9	10-24	25+
86EI-4.75	4-3/4"	.630"	\$34.40	\$31.55	\$30.10

### EXCELTA CLASSICS-LAVENDER LINE PRIMADIUM Long, Narrow Chain-Nose Pliers

- Ideal for forming, bending, and precision-assembly work
- Smooth jaws and radiused edges reduce scratching and marring of delicate component leads

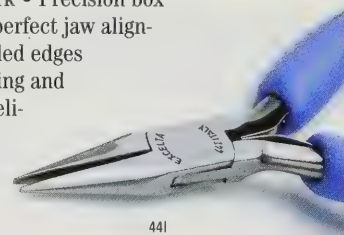


11I

P/N	Description	A	B	1-9	10-24	25+
11I	Smooth jaws	4-3/4"	1.180"	\$25.75	\$23.60	\$22.55
11DI	Serrated jaws	4-3/4"	1.180"	25.75	23.60	22.55

### EXCELTA CLASSICS-LAVENDER LINE MICROMADIUM Ultra-Fine, Long, Narrow Chain- Nose Pliers

- Ideal for forming, bending, and precision-assembly work
- Precision box joint allows perfect jaw alignment
- Beveled edges prevent nicking and marring of delicate component leads

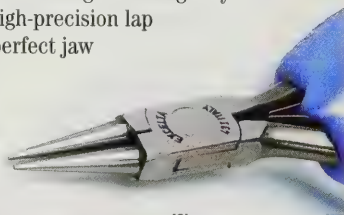


44I

P/N	A	B	1-9	10-24	25+
44I	4-1/2"	.906"	\$26.30	\$24.10	\$23.00

### EXCELTA CLASSICS-LAVENDER LINE MICROMADIUM Ultra-Fine Oval-Nose Pliers

- Excellent for forming or coiling very fine wire
- High-precision lap joint allows perfect jaw alignment

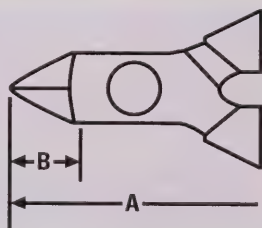


43I

P/N	A	B	1-9	10-24	25+
43I	4-1/2"	.906"	\$26.45	\$24.25	\$23.15

#### Dimensions:

- A = Overall Length  
B = Jaw or Nose Length



### EXCELTA CLASSICS-LAVENDER LINE PRIMADIUM Oval- Head Maximum Full- Flush Cutter

- For general use on smaller soft wire up to 22 AWG



99EI

P/N	A	B	1-9	10-24	25+
99EI	4-1/4"	.472"	\$33.40	\$30.60	\$29.25

### EXCELTA SELECTA® Clean-Cut Micro Nipper

- For general use • Cuts wire up to 16 AWG

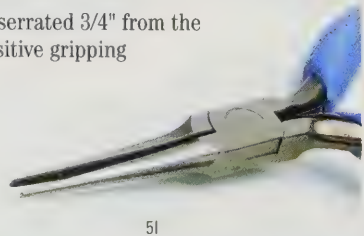


SE-25

P/N	A	B	1-9	10-24	25+
SE-25	4-1/2"	.400"	\$14.50	\$13.30	\$12.70

### EXCELTA CLASSICS-LAVENDER LINE PRIMADIUM Long, Narrow Needle-Nose Pliers

- Jaws are serrated 3/4" from the tip for a positive gripping surface



5I

P/N	A	B	1-9	10-24	25+
5I	5-5/8"	1.890"	\$29.70	\$27.25	\$26.00

### EREM®, XCELITE® and ACCU-LITE™ Ergonomic-Handle Tools from COOPER TOOLS

COOPER TOOLS, one of the world's leading designers and manufacturers of electronics assembly tools, has developed the ACCU-LITE handle—specifically to reduce exposure to cumulative trauma disorder. The ACCU-LITE handle is available on selected EREM and XCELITE diagonal cutters and assembly pliers. For a complete brochure, order EAL-9500.

NOTE: For ACCU-LITE ergonomic handle design you must add the prefix "E" to the part number when ordering (for example, E2160).

- Thumb-flair increases tool control
- Exclusive soft, nonslip foam grips provide positive gripping and maximum comfort
- Identically-formed handles allow either right- or left-hand use
- Anti-static grip material dissipates static charges
- Concave configuration disperses gripping pressure
- Extended handle permits use of all fingers

### EREM Diagonal Cutter

- Small oval-head general-purpose long-life tool
- Antistatic handles
- Ergonomic handle



E2141E

P/N	Description	A	B	1-11	12+
E2140E	Semi-flush cutter	6"	.394"	\$53.35	\$48.65
E2141E	Full-flush cutter	6"	.394"	54.20	50.00

### EREM Full-Flush Diagonal Cutter

- Full-flush cutter
- Antistatic handles
- Ergonomic handle



E2151E

P/N	Description	A	B	1-11	12+
E2151E	Full-flush diagonal cutter	4.75"	.472"	\$55.45	\$51.00



## EREM 2100 Series Cutters

- 100% machined extrusions • Integrated screw-joint assembly • Dual leaf stainless-steel springs
- Semi-flush or full-flush cutting edges • Small, medium, or large oval cutter head design • Anti-glare finish • Impact-resistant anti-static molded grips • All 2100 Series tools available with ACCU-LITE ergonomically-designed handles

### EREM 2100 Series Small Oval-Head Diagonal Cutter

- General-purpose long-life tool • Small, with oval head



2140E

P/N	Description	A	B	1-11	12+
2140E	Semi-flush	4-1/4"	.394"	\$41.35	\$36.65
2141E	Full-flush	4-1/4"	.394"	42.20	37.40

### EREM 2100 Series Medium Oval-Head Diagonal Cutter

- Medium semi-flush cutter with oval head • General-purpose heavy-duty tool



2150E

P/N	Description	A	B	1-11	12+
2150E	Medium oval-head diagonal cutter	4-3/4"	.472"	\$42.65	\$37.85

### EREM MAGIC LINE 500 Series Oval-Head Diagonal Cutter

This is the best semi-flush cutter for all soft wire up to 16 AWG. It has an oval head and an anti-glare finish.



511E

P/N	Description	A	B	1-11	12+
511E	Oval-head diagonal cutter	4-1/2"	.394"	\$62.65	\$55.55

## EREM MAGIC LINE 500 Series Antishock Shear-Cutter

This tool cuts leads to a predetermined length and reduces mechanical shock to components. The standard-cut length is .040"—orders can be placed for custom-cut lengths.



530E

P/N	Description	A	B	1-11	12+
530E	Antishock shear-cutter	4-3/4"	.787"	\$92.70	\$82.15

## EREM MAGIC LINE 500 Series Tapered-and-Relieved-Head Tip Cutter

- Smallest tapered and relieved-head tip cutter • Designed for full-flush cutting in confined areas • Cuts soft wire up to 24 AWG



570E

P/N	Description	A	B	1-11	12+
570E	Tapered and relieved-head tip cutter	4-3/4"	.866"	\$73.80	\$65.40

## EREM Miniature Angled-Tip Cutter

This miniature, angled, full-flush tip cutter is ideal for delicate horizontal or vertical cutting of soft wire (24 AWG and smaller) and .007"—.015" nickel ribbon.



575E

P/N	Description	A	B	1-11	12+
575E	Miniature angled-tip cutter	4-1/4"	.591"	\$72.45	\$64.20

## EREM MAGIC LINE 500 Series Angled-Tip Cutter

This medium, 45°-angle, full-flush tip cutter cuts 22 AWG and smaller soft wire, as well as .010"—.030" nickel ribbon. It can be used in either the vertical or horizontal position.

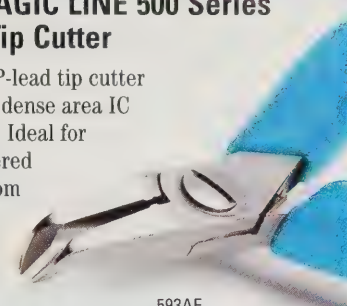


582E

P/N	Description	A	B	1-11	12+
582E	Angled-tip cutter	4-1/2"	.787"	\$69.40	\$61.55

## EREM MAGIC LINE 500 Series Angled-Tip Cutter

- Angled DIP-lead tip cutter designed for dense area IC pin cutting • Ideal for cutting soldered DIP leads from back-side of ICs

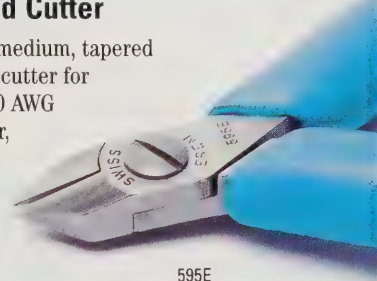


593AE

P/N	Description	A	B	1-11	12+
593AE	Angled-tip cutter	4-3/4"	.787"	\$85.40	\$75.75

## EREM MAGIC LINE 500 Series Tapered Cutter

This is a medium, tapered full-flush cutter for cutting 20 AWG or smaller, soft wire.



595E

P/N	Description	A	B	1-11	12+
595E	Tapered cutter	4-1/4"	.472"	\$52.70	\$46.75

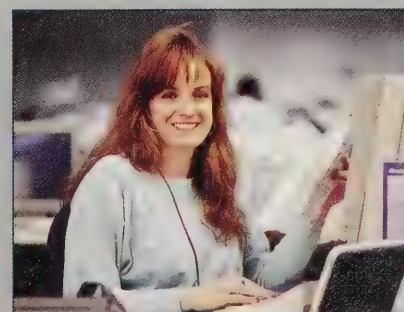
## EREM MAGIC LINE Diagonal Cutter

- Miniature full-flush cutter
- Tapered and relieved head facilitates use in areas of limited access or in densely packed areas • Cuts fine, soft wire up to 22 AWG
- Ergonomic handle



E676E

P/N	A	B	1-11	12+
E676E	6"	.354"	\$79.00	\$71.40



Have a Question? Call Us.



New Product: This symbol represents the industry's latest offerings.



### EREM MAGIC LINE 600 Series Tapered- and Relieved-Head Diagonal Cutter

- Miniature full-flush cutter with a tapered- and relieved-head
- Ideal for use in tight areas • Designed to cut fine, soft wire up to 22 AWG



676E

P/N	Description	A	B	1-11	12+
676E	Miniature full-flush cutter	4-1/4"	.354"	\$67.00	\$59.40

### EREM MAGIC LINE 700 Series Tapered- and Relieved-Head Diagonal Cutter

- Full-flush cutter with a tapered and relieved head
- Superb for working in confined areas • Designed to cut soft wires and leads up to 22 AWG



776E

P/N	Description	A	B	1-11	12+
776E	Tapered- and relieved-head diagonal cutter	4-1/4"	.354"	\$61.20	\$54.25

## EREM "I" Series

The "I" Series includes a popular selection of pliers and cutters designed to meet most miniature assembly applications. Standard features include: choice of head designs, full-flush semi edges, dual-leaf springs, antistatic foam grips, and precision box and lap joints.

### EREM "I" Series Angulated-Head Full-Flush Ultra-Fine Cutter

- For fine full-flush cutting • Blades work horizontally or vertically with excellent visibility • Blue foam grips • ESD-safe



57EI

P/N	Description	1-11	12+
57EI	Full-flush ultra-fine cutter, 4-1/2"	\$46.50	\$41.25

### EREM "I" Series Diagonal Relieved-Head Maximum Full-Flush Cutter with Foam Cushion Grips

- Relieved heads for extremely fine full-flush cutting • For 24 AWG and smaller soft wire
- Blue foam grips
- ESD-safe



76EI

P/N	Description	1-11	12+
76EI	Diagonal relieved-head maximum full-flush cutter, 4"	\$39.70	\$35.20

### EREM "I" Series Ultra-Fine, Tapered-Head Maximum Full-Flush Cutter

- Tapered head for full-flush cutting • For cutting 22 AWG or smaller soft wire • Blue foam grips • ESD-safe



77EI

P/N	Description	1-11	12+
77EI	Ultra-fine, tapered-head maximum full-flush cutter, 4"	\$39.70	\$35.20

### EREM "I" Series Ultra-Fine, Oval-Head Maximum Full-Flush Cutter

- Round nose for optimum full-flush cutting • For 22 AWG and smaller leads
- Blue foam grips • ESD-safe



79EI

P/N	Description	1-11	12+
79EI	Ultra-fine, oval-head maximum full-flush cutter, 4"	\$39.70	\$35.20

### EREM "I" Series Tapered-Head Maximum Full-Flush Cutter

- Tapered head for full-flush cutting • For 22 AWG and smaller soft wire • Blue foam grips • ESD-safe

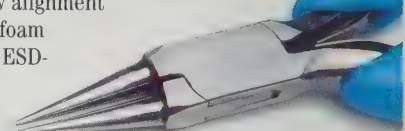


95EI

P/N	Description	1-11	12+
95EI	Tapered-head maximum full-flush cutter, 4"	\$38.15	\$33.85

### EREM "I" Series Round-Nose Smooth Pliers

- Good for forming or coiling very fine wire • Precision box-joint ensures perfect jaw alignment
- Blue foam grips • ESD-safe

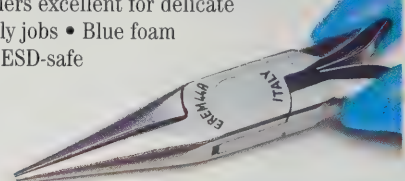


43I

P/N	Description	1-11	12+
43I	Round-nose smooth pliers, 4-1/2"	\$28.80	\$25.50

### EREM "I" Series Ultra-Fine Chain-Nose Pliers

- Precision box-joint alignment and radiused edges make these chain-nose pliers excellent for delicate assembly jobs • Blue foam grips • ESD-safe



44AI

P/N	Description	1-11	12+
44AI	Ultra-fine chain-nose pliers, 4-1/2"	\$31.85	\$28.25

### EREM "I" Series Ultra-Fine, Smooth Needle-Nose Pliers

- For fine assembly work • Radiused edges to protect component leads
- Precision jaw alignment
- Blue ESD-safe foam grips

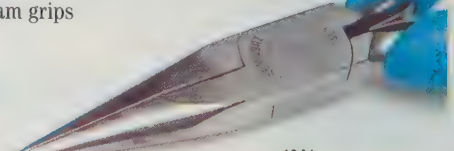


47I

P/N	Description	1-11	12+
47I	Ultra-fine, smooth, needle-nose pliers, 4-1/2"	\$31.15	\$27.65

### EREM "I" Series Extra-Long Chain-Nose Pliers

- Smooth jaws • Radiused edges reduce nicking of wire and delicate component leads
- Blue ESD-safe foam grips



49AI

P/N	Description	1-11	12+
49AI	Extra-long, chain-nose pliers, 5-1/2"	\$36.70	\$32.55



## EREM's "N" Series Diagonal Cutters

These EREM-MAGIC cutters are manufactured using a unique Swiss lamination technique. It is a multiple-extrusion process that super-compacts molecules of EREMMADIUM® steel to impart extra strength to the cutters. This ensures longer wear and eliminates breakage. All EREM "N" Series cutters come with the MAGIC internal spring.



### EREM "N" Series Diagonal Semiflush Cutter

- Small-oval head • Semiflush • Available with ergonomic handles • ESD-safe • Cuts 32 AWG–16 AWG

P/N	Description	1-11	12+
612N	Semiflush diagonal cutter, 4"	\$45.85	\$40.65
E612N	612N with ergonomic handles	57.85	52.65

### EREM "N" Series Diagonal Semiflush Cutter

- Medium-oval head • Semiflush • Available with ergonomic handles • ESD-safe • Cuts 28 AWG–14 AWG

P/N	Description	1-11	12+
512N	Semiflush diagonal cutter, 5"	\$48.45	\$42.95
E512N	512N with ergonomic handles	60.45	54.95

### EREM "N" Series Diagonal Full-Flush Cutter

- Small-oval head • Full-flush • Available with ergonomic handles • ESD-safe • Cuts 38 AWG–16 AWG

P/N	Description	1-11	12+
622N	Full-flush diagonal cutter, 4"	\$47.55	\$42.15
E622N	622N with ergonomic handles	59.55	54.15

### EREM "N" Series Diagonal Full-Flush Cutter

- Medium-oval head • Full-flush • Available with ergonomic handles • ESD-safe • Cuts 32 AWG–14 AWG

P/N	Description	1-11	12+
522N	Full-flush diagonal cutter, 5"	\$50.65	\$44.90
E522N	522N with ergonomic handles	62.65	56.85



New Product: This symbol represents the industry's latest offerings.

## EREM "N" Series Diagonal Super-Flush Cutter

- Medium-oval head • Super full-flush
- Available with ergonomic handles • ESD-safe
- Cuts 38 AWG–18 AWG

P/N	Description	1-11	12+
632N	Super full-flush diagonal cutter, 4"	\$50.65	\$44.95
E632N	632N with ergonomic handles	62.60	56.90
532N	Super full-flush diagonal cutter, 5"	53.70	47.70
E532N	532N with ergonomic handles	65.70	59.70

## EREM 2200 Series Diagonal Cutters and Pliers

EREMs 2200 Series offers the ultimate in comfort, control, and performance. Fingers and thumb self-position on the handles to optimize comfort and lessen fatigue. Available in 5 inch diagonal cutters and 6 inch needle nose pliers. Tools feature magic internal springs.

- ESD-safe cushion grips



P/N	Description	1-11	12+
2212E	Semi-flush diagonal cutter, 32–16 AWG	\$64.40	\$48.30
2222E	Full-flush diagonal cutter, 38–16 AWG	65.35	49.65
2232E	Super full-flush diagonal cutter, 38–18 AWG	68.70	52.20
2211P	Needle nose-fine tip smooth jaw pliers	62.50	47.45

## XCELITE Oval-Head General-Purpose Cutter

- Designed for general-purpose cutting—handles most cutting requirements • Oval head, with 7/16" cutting edges, increases cutting life



P/N	Description	A	B	1-11	12+
MS54	Oval-head general-purpose cutter	4"	13/32"	\$12.20	\$10.90

## XCELITE Relieved-Head Diagonal Cutting Pliers

- Designed for flush-cutting in areas with limited access • Relieved head helps clear closely spaced components



P/N	Description	A	B	1-11	12+
MS54-3J	Relieved-head diagonal cutting pliers	4"	15/32"	\$13.85	\$12.35

## XCELITE Slim-Line Tapered-Head Cutter

- Designed for flush-cutting in extremely confined spaces • Helps get between closely-spaced components • Tapered sides and slim-line-head profile

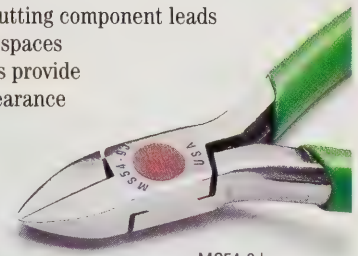


MS54-5J

P/N	Description	A	B	1-11	12+
MS54-5J	Slim-Line tapered-head cutter	4"	13/32"	\$12.95	\$11.55

## XCELITE Tapered-Head Flush-Cutter

- For flush-cutting component leads in restricted spaces
- Narrow tips provide increased clearance

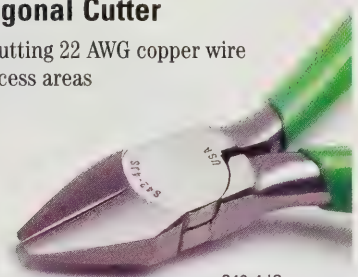


MS54-9J

P/N	Description	A	B	1-11	12+
MS54-9J	Tapered-head flush-cutter	4"	15/32"	\$13.45	\$11.95

## XCELITE Relieved Tapered-Head Diagonal Cutter

- For flush-cutting 22 AWG copper wire in limited access areas

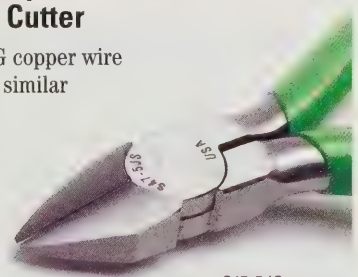


S42-4JS

P/N	Description	A	B	1-11	12+
S42-4JS	Relieved tapered-head diagonal cutter	4"	5/8"	\$17.70	\$15.75

## XCELITE Tapered-Head Diagonal Cutter

- For 20-AWG copper wire (flush-cutter similar to 84-CG)



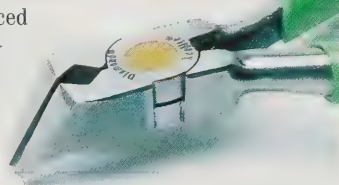
S47-5JS

P/N	Description	A	B	1-11	12+
S47-5JS	Tapered-head diagonal cutter	5"	3/4"	\$13.15	\$11.75



### XCELITE Angled Diagonal-End Cutter (29°)

- Designed for flush-cutting directly above the work area • Angled head provides clearance for closely-spaced adjacent components

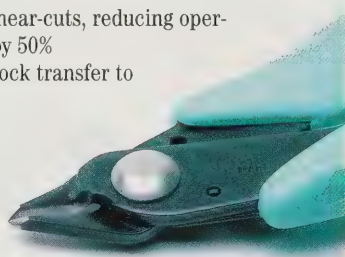


GA54-J

P/N	Description	A	B	1-11	12+
GA54-J	Angled diagonal-end cutter	4"	7/16"	\$21.75	\$19.50

### XCELITE Micro Series Flush-Cutters

- Produces shear-cuts, reducing operator fatigue by 50%
- Minimal shock transfer to components



170M



2178M



75M

P/N	Description	A	B	1-11	12+
170M	Flush-cutter, low profile	5"	1/2"	\$4.80	\$4.25
175M	Flush-cutter, low profile with safety clip	5"	1/2"	6.05	5.45
1178M	Flush-cutter, heavy-duty	5-5/8"	.600"	8.85	7.90
2178M	Flush-cutter, heavy-duty with safety clip	5-5/8"	.600"	10.55	9.45
75M	Angled flush-cutter, 75° angle	5-7/16"	.045"	11.85	10.55

### XCELITE Static-Dissipative Series Flush-Cutter

- Static-dissipative grips, specially hardened for durability

170D

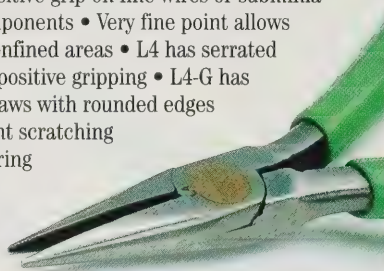


P/N	Description	A	B	1-11	12+
170D	Flush-cutter, low profile	5"	1/2"	\$10.90	\$9.75

### XCELITE Subminiature Needle-Nose Pliers

- For positive grip on fine wires or subminiature components • Very fine point allows use in confined areas • L4 has serrated jaws for positive gripping • L4-G has smooth jaws with rounded edges to prevent scratching and marring

L4

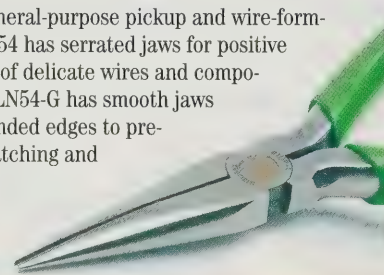


P/N	Description	A	B	1-11	12+
L4	Subminiature needle-nose pliers, serrated jaws	4"	13/16"	\$12.15	\$10.85
L4-G	Subminiature needle-nose pliers, smooth jaws	4"	13/16"	13.55	12.10

### XCELITE Thin Long-Nose Pliers

- For general-purpose pickup and wire-forming • LN54 has serrated jaws for positive gripping of delicate wires and components • LN54-G has smooth jaws with rounded edges to prevent scratching and marring

LN54

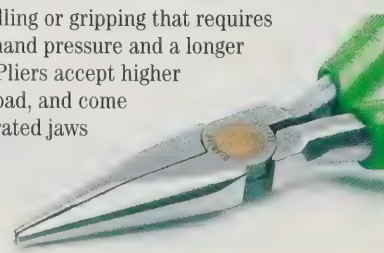


P/N	Description	A	B	1-11	12+
LN54	Thin long-nose pliers, serrated jaws	5"	1-3/16"	\$13.35	\$11.85
LN54-G	Thin long-nose pliers, smooth jaws	5"	1-3/16"	13.45	12.05

### XCELITE Long Standard-Nose Pliers

- For pulling or gripping that requires greater hand pressure and a longer reach • Pliers accept higher handle load, and come with serrated jaws

LN55

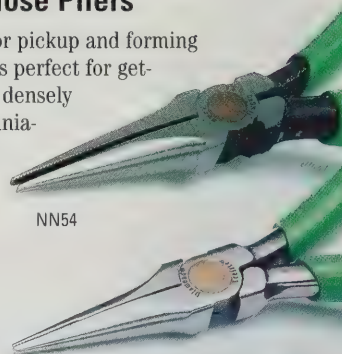


P/N	Description	A	B	1-11	12+
LN55	Long standard-nose pliers	5-1/2"	1-11/16"	\$13.70	\$12.20

### XCELITE SLIMLINE Needle-Nose Pliers

- Designed for pickup and forming
- Slim head is perfect for getting between densely spaced subminiature components
- Comes with serrated jaws to facilitate pulling and gripping

NN54



NN54-G

P/N	Description	A	B	1-11	12+
NN54	Needle-nose pliers, serrated jaws	5"	1-3/16"	\$15.70	\$14.00
NN54-G	Needle-nose pliers, smooth jaws	5"	13/16"	15.80	14.10

### XCELITE Very Fine Needle-Nose Pliers

- Very fine serrations on jaws
- Slightly beveled inside edges

NN55

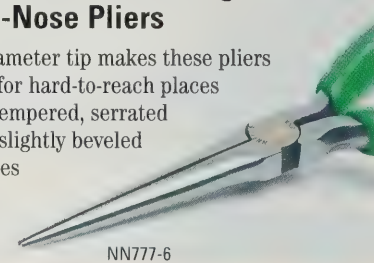


P/N	Description	A	B	1-11	12+
NN55	Very fine needle-nose pliers	5-1/2"	1-11/16"	\$15.65	\$13.95

### XCELITE Extra-Thin, Long Needle-Nose Pliers

- 1/16" diameter tip makes these pliers excellent for hard-to-reach places
- Spring-tempered, serrated jaws with slightly beveled inside edges

NN777-6



P/N	Description	A	B	1-11	12+
NN777-6	Extra-thin long needle-nose pliers	6"	2-5/16"	\$14.95	\$13.30

### XCELITE Long Chain-Nose Pliers with Side Cutter

- Spring-tempered, fine serrated jaws with hardened jaw surfaces
- Electronically hardened cutter edges

SN55



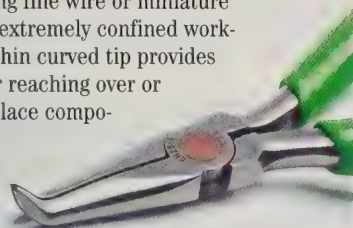
P/N	Description	A	B	1-11	12+
SN55	Long chain-nose pliers w/side cutter	5-1/2"	1-11/16"	\$14.95	\$12.85



## XCELITE Thin-Tip Curved Nose Pliers

- For handling fine wire or miniature parts within extremely confined working areas • Thin curved tip provides clearance for reaching over or between in-place components

CN25-5

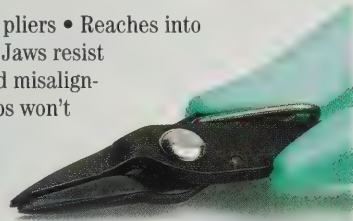


P/N	Description	A	B	1-11	12+
CN25-5	Thin tip curved nose pliers with serrated jaws	5"	1-15/64"	\$16.45	\$14.60
CN25-5G	Thin tip curved nose pliers with smooth jaws	5"	1-15/64"	17.20	15.30

## XCELITE Micro-Series Pliers

- Narrow-tip pliers • Reaches into tight spots • Jaws resist crossover and misalignment, and tips won't spread

378M



P/N	Description	A	B	1-11	12+
378M	Micro-series pliers with serrated jaws	5-1/2"	1"	\$8.35	\$7.45
378SMM	Micro-series pliers with smooth jaws	5-1/2"	1"	8.35	7.45

## XCELITE Static-Dissipative-Series Pliers

- Comes with static-dissipative grips

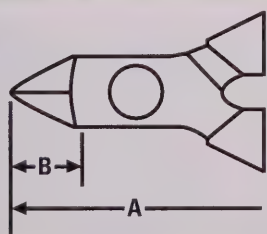
378D



P/N	Description	A	B	1-11	12+
378D	Static-dissipative pliers with serrated jaws	5-1/2"	1"	\$12.05	\$10.75
378SMD	Static-dissipative pliers with smooth edges	5-1/2"	1"	12.05	10.75

### Dimensions:

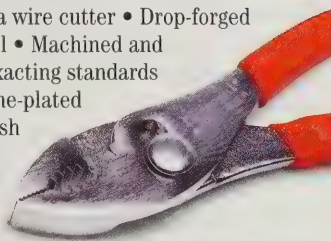
A = Overall Length  
B = Jaw or Nose Length



## CRESCENT Combination Slip-Joint Pliers

- Comes with a wire cutter • Drop-forged from alloy steel • Machined and hardened to exacting standards • Nickel chrome-plated with a full polish • Standard plastic handles

G26C



P/N	Description	A	B	1-11	12+
G26C	Combination slip-joint pliers	6"	1-5/16"	\$12.20	\$9.05
H26	Combination slip-joint pliers with knurled handles	6"	1-1/4"	7.25	5.40

## CRESCENT Groove Joint Pliers

- Forged-groove undercut locking feature prevents slippage when gripping • Thin-jaw design allows access to confined areas • Opens to a full 2"

R210C

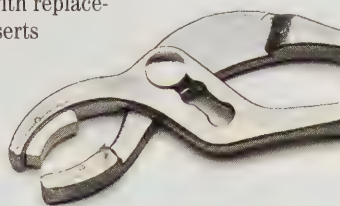


P/N	Description	A	B	1-11	12+
R210C	Groove joint pliers	10"	2-5/16"	\$18.30	\$11.85

## CRESCENT A-N Connector Pliers

- Designed to fit A-N electrical connectors • Three adjustment positions • Equipped with replaceable nylon inserts to protect connectors • Chrome-plated

529-10



P/N	Description	A	B	1-11	12+
529-10	A-N connector pliers	10"	1-30/64"	\$37.00	\$27.40
529-10-KIT	Replacement inserts and screws			4.75	4.35

## XCELITE Stainless Slim Nose Diagonal Cutter

- Patented handle spring • Cuts .051" soft non-ferrous wire and .018" soft-steel wire

117-CG



P/N	Description	A	B	1-11	12+
117-CG	Slim nose diagonal cutter	4"	5/16"	\$47.90	\$42.55

## XCELITE Utility Pliers

- Midget slip-joint with narrow serrated jaws for close work • 3 jaw-opening adjustments to 1/2"

50-CG

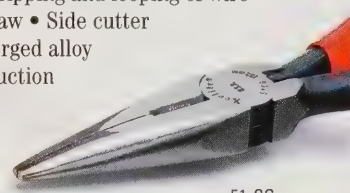


P/N	Description	A	B	1-11	12+
50-CG	Midget slip joint pliers	5"	1/2"	\$16.80	\$14.95

## XCELITE Long-Nose Pliers with Side Cutters

- For firm gripping and looping of wire • Serrated jaw • Side cutter feature • Forged alloy steel construction

51-CG

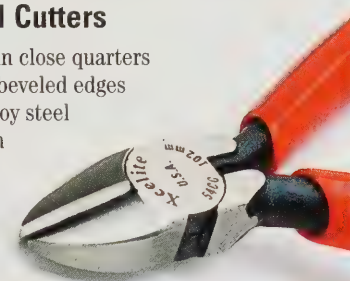


P/N	Description	A	B	1-11	12+
51-CG	Long-nose pliers	6"	1-7/8"	\$16.80	\$14.95

## XCELITE Oval-Head Diagonal Cutters

- For work in close quarters • Standard beveled edges • Forged alloy steel construction

54-CG

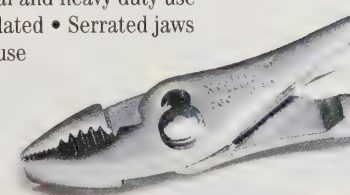


P/N	Description	A	B	1-11	12+
54-CG	Oval-head diagonal cutters	4"	1/2"	\$15.85	\$14.95
55-CG	Oval-head diagonal cutters	5"	11/16"	16.15	14.95

## XCELITE Combination Slip-Joint Pliers

- For general and heavy duty use • Chrome-plated • Serrated jaws for general use

76-C



P/N	Description	A	B	1-11	12+
76-C	Combination slip-joint pliers	6"	1"	\$8.10	\$7.25

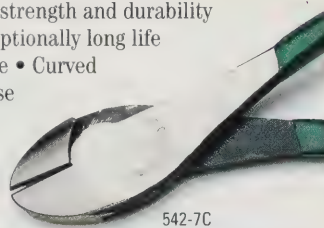
We provide reduced pricing on large-quantity orders.

We are a full-service distributor with a broad range of the best products.



## CRESCENT® Oval-Head Heavy-Duty Cutter

- Designed for strength and durability
- Offer an exceptionally long life under heavy use • Curved handles increase hand comfort when high pressure is necessary



542-7C

P/N	Description	A	B	1-11	12+
542-7C	Heavy-duty cutter	7"	25/32"	\$21.70	\$16.10

## CRESCENT Chrome-Finish Adjustable Wrenches

- Made of alloy steel • Low-fusion, bright-red PLASTISOL safety grip • 6" and 8" models feature wide-opening wrenches, 25% wider than conventional adjustable wrenches



P/N	Description	Length	Jaw Opening	1-11	12+
AC14C	Adjustable wrench	4"	1/2"	\$19.95	\$14.75
AC16C	Wide-opening adjustable plastic-handle wrench	6"	15/16"	20.60	15.25
AC18C	Adjustable wrench	8"	15/16"	21.70	16.05

- Same as above, but without red plastic handle

P/N	Description	Length	Jaw Opening	1-11	12+
AC14	Adjustable wrench	4"	1/2"	\$18.15	\$13.45
AC16	Wide-opening adjustable wrench	6"	15/16"	19.05	14.10

## WISS MULTIMASTER Long-Blade Snips

- Combines long cut of tinner's snips with the strength of compound action • Fast cuts in several types of material including plastic, sheet metal, aluminum, vinyl siding, screening, and many more • Compound action multiplies force of the hand by 5 times • Cuts up to 20-ga steel • Non-slip serrated jaws and non-slip textured grips



M300

P/N	Description	A	B	1-11	12+
M300	MULTIMASTER long-blade snips	9-1/2"	3"	\$21.40	\$16.10

## XCELITE XP1 Cordless-Driver Kit

This professional cordless tool features 2 speeds and an 8-stage adjustable clutch to precisely control torque.

Kit includes: • Driver • Battery and charger • 3 bits and adapter

- Multistage clutch • 2-speed control (low 180, high 360) • 3.6-V nickel-cadmium battery • XP1BC quick 1-hr charger • UL Listed—also UL Listed to Canadian safety standards



P/N	Description	Each
XP1	Cordless-driver kit	\$139.00
XP1B	3.6-V nickel-cadmium battery	35.00

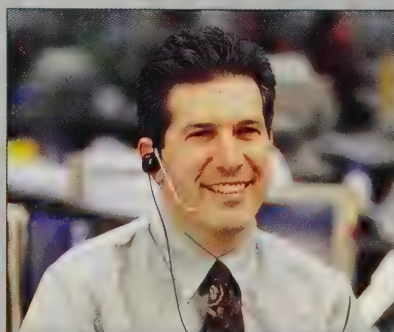
## MILWAUKEE Reversible Cordless Screwdriver

- 1/4" chuck drive system • Adjustable 2-position hinged handle • 6-stage torque control • 1 quick-charging battery pack • Reversible in the charging adapter • Includes: battery pack, charger, 2 PHILLIPS bits, and 1 slotted bit



48-59-0180

P/N	Description	Each
6539-6	Cordless 1/4" screwdriver	\$139.00
6546-6	2-speed cordless screwdriver	150.00
48-11-0100	Battery pack for 6539-1	35.00
48-59-0180	Charger, 120 V	70.00



Call Us Toll Free.

## CRESCENT Locking Pliers and Clamps

- Curved or straight jaw with or without wire cutter • Plated finish • Compound action for powerful nonslip locking grip • One-hand release lever



P/N	Description	1-11	12+
CP10S	8-5/8" straight jaw	\$14.30	\$10.60
CP7S	7-1/8" straight jaw	13.25	9.80
CP6L	6-9/16" long-nose with wire cutter	15.05	11.15
CP5C	5-1/2" curved jaw with wire cutter	12.95	9.60

## PLATO PLATOSHEAR Lead Cutters

The thin profiles of these shear-cutters let you get into areas that conventional cutters do not.

- Meet MIL-STD-2000 • Ergonomically acceptable • Reduce operator fatigue • Require 50% less operator effort • Lead former forms standoffs on component leads • Made in USA • Cushioned handles



P/N	Description	1-9	10-24	25+
170	Flush cuts up to 18-AWG copper wire	\$6.95	\$4.29	\$2.75
175	170 with safety guard	7.35	6.55	5.30
170EP	170 with quick-pickup handles	5.05	4.15	3.35
175EP	175 with quick-pickup handles and safety guard	7.35	6.60	5.30
170SD	170 with static-dissipative grips	8.05	7.05	6.10
170SMD	Saf-T-Link handle	7.75	6.45	6.15
175SD	175 with static-dissipative grips and safety guard	10.10	8.95	7.75
1755	Big shear, reduces cable cut-end distortion	11.05	10.00	9.15
473	Lead former	32.80	30.40	27.50

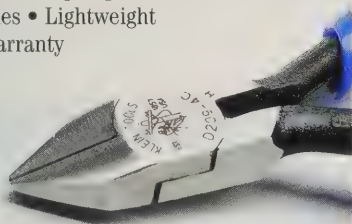


## KLEIN TOOLS Midget Pointed-Nose Diagonal Cutters

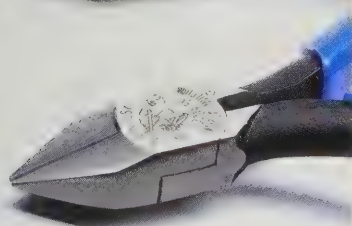
These cutters have a sharp nose for working in confined areas, and are widely used for trimming printed-circuit boards. They are specifically designed for tip cutting.

- Semiflush • Coil spring • Plastic-dipped handles • Lightweight
- Lifetime warranty

D209-4C



D209-5C



P/N	A	B	1-9	10-24	25+
D209-4C	4-3/16"	1/2"	\$20.25	\$18.85	\$17.50
D209-5C	5"	11/16"	21.65	20.15	18.75

## KLEIN TOOLS Midget Slim Pointed-Nose Diagonal Cutters

These are similar in design to the semi-flush-cutting D209 Series pliers, but relieved on the back to permit entry into confined areas. They are specifically designed for tip cutting.

- Coil spring • Plastic-dipped handles
- Semi-flush • Relieved head
- Lifetime warranty

D219-4C



P/N	A	B	1-9	10-24	25+
D219-4C	4-3/16"	1/2"	\$21.80	\$20.30	\$18.85

## From the bench

### THE PROPER USE OF TOOLS

Courtesy of Klein Tools

**CAUTION:** Never use any pliers or cutters on live electrical circuits.

**WARNING:** The cushion grips on tool handles are provided for comfort. They are NOT intended to give any degree of protection against electric shock and should NOT be used on live electric circuits.

**WARNING:** Plastic-dipped or slip-on plastic handles are NOT intended for protection against electrical shock.

## KLEIN TOOLS Midget Pointed-Nose Diagonal Cutter with High-Hardness Blades

Designed for cutting nickel ribbon wire, these diagonal-cutting blades are hardened to ROCKWELL C60-and are as hard as a file. The nose is only 1/16" (1.6 mm) at the tip-for use in confined spaces. The semi-flush blades are hand-honed under a magnifier and are 3/16" (5 mm) long at the tip.

- Fully polished head and neck • Blades hardened to ROCKWELL C60 • Coilspring • High-gloss finish • Plastic-dipped handles

D230-4C



P/N	A	B	1-9	10-24	25+
D230-4C	4-3/16"	1/2"	\$23.60	\$21.95	\$20.40

## KLEIN TOOLS Midget Pointed-Nose Diagonal Cutter with Narrow Jaw

This is a narrow-jaw and narrow-hinge diagonal cutter. It reaches into confined areas to permit full-flush cutting.

- Narrow Jaw • Full-flush • Fully polished head and neck • Coil spring • Plastic-dipped handles • Lifetime warranty

D244-5C



P/N	A	B	1-9	10-24	25+
D244-5C	5"	11/16"	\$23.85	\$22.20	\$20.65

## KLEIN TOOLS Midget Standard-Nose Diagonal Cutters

This is a general-purpose semi-flush cutter with a short, strong tapered nose.

- General-purpose • Semi-flush • Coil spring
- Plastic-dipped handles
- Lifetime warranty

D257-4C



P/N	A	B	1-9	10-24	25+
D257-4C	4-3/16"	1/2"	\$21.35	\$19.85	\$18.50

## KLEIN TOOLS Midget Pointed-Nose Diagonal Cutters with Extra-Narrow Jaw

This cutter has a fine, narrow tapered jaw and a narrow hinge for especially delicate work.

- Full-flush • Narrow jaw • Fully polished head and neck • Coil spring • Plastic-dipped handles • Lifetime warranty

D259-4C



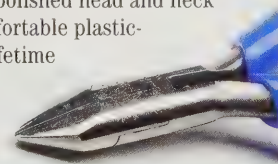
P/N	A	B	1-9	10-24	25+
D259-4C	4-3/16"	1/2"	\$24.25	\$22.55	\$21.00

## KLEIN TOOLS Midget Tapered-Nose Diagonal Cutters with Midget Jaw

This is KLEIN TOOLS smallest diagonal cutter. It is designed for full-flush cutting in very close quarters with maximum visibility.

- Full-flush • Fully-polished head and neck
- Coil spring • Comfortable plastic-dipped handles • Lifetime warranty

D295-4C



P/N	A	B	1-9	10-24	25+
D295-4C	4-3/16"	1/2"	\$23.10	\$21.50	\$20.00

## KLEIN TOOLS Midget Pliers with Curved Needle-Nose

These pliers are designed to bend and form fine wire. The extra-slim nose is perfect for delicate work in narrow spaces. The 60° bend at the nose permits easy access to work with full visibility. Polished inside jaws and radiused jaw edges prevent wire nicking.

- Extra-slim nose • 60° bend at nose • Coil spring • Fully polished head and neck
- Plastic-dipped handles
- Lifetime warranty

D320-4-1/2C



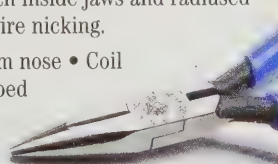
P/N	A	B	1-9	10-24	25+
D320-4-1/2C	4-5/8"	7/8"	\$25.30	\$23.55	\$21.90

## KLEIN TOOLS Midget Slim-Nose Pliers with Smooth Jaws

These are the smallest, lightest slim-nose pliers available. The smooth inside jaws and radiused jaw edges prevent wire nicking.

- Smooth jaws • Slim nose • Coil spring • Plastic-dipped handles • Lifetime warranty

D322-4-1/2C



P/N	A	B	1-9	10-24	25+
D322-4-1/2C	4-3/4"	1-1/16"	\$19.10	\$17.80	\$16.55



EXCELTA

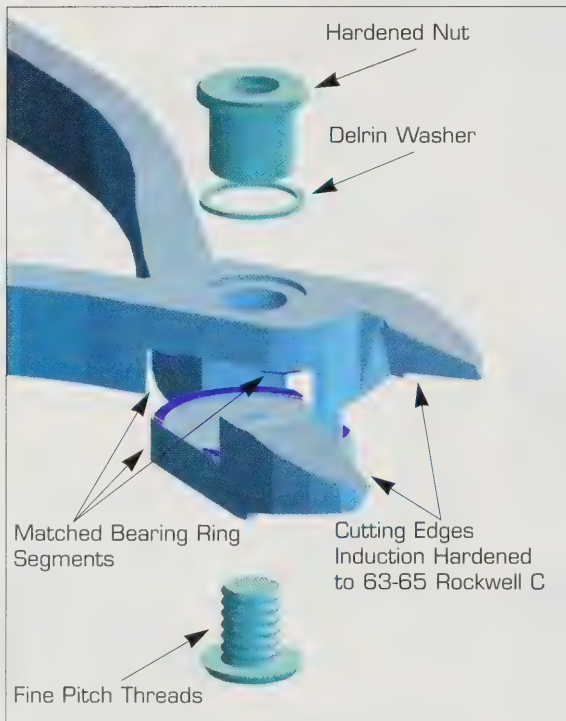
Presents



Never Duplicated

# THE SUPER CUTTERS

100% Made in the U.S.A.



Enlarged 200%

7000 Series

Now Upgraded to 5 Stars



from 4 Stars ★★★★★

After 16 years of exceptional performance

## Now Featuring

- ★ Hardest edges, to 63/65 Rockwell C
- ★ Comfortable ergonomic cushion handles
- ★ ESD safe grips
- ★ Long life from bearing ring segment joint
- ★ Anti-friction Delrin washer
- ★ Protective Cap on every cutter

- ★ Dual Sleeve Grips
- ★ Stainless steel leaf springs
- ★ Finest leads (to 0,1 mm) cut absolutely flush
- ★ Adjustable stop protects Optimum flush edges
- ★ Individually tested, performance guaranteed
- ★ All angulated cutters have optimum flush cutting edges

For additional information please visit the @ONCE web site at  
[www.4atonce.com](http://www.4atonce.com) or call (800) 261-9602, Ext. 4002



# From the bench

## CRITICAL TIP MEASUREMENT

Courtesy of Excelta

For years people who use tweezers have been concerned with the consistency of the extreme tip measurement. When working with tweezers, it's the last 2 mm that count. The point of contact, the manipulation, the ability to

penetrate dense areas and work confidently in today's exacting environment all depend on the CTM of each tweezer used. Excelta is the first to guarantee each and every CTM in their top 4 lines of precision tweezers.

## EXCELTA TWEEZERS

### Features

Ref. No.	Positive Features	Negative Features
3c	Carbon steel, good life, strong flame-hardened tips	Highly magnetic, no rust resistance
3c-S	Stainless steel, partial rust resistance, good tips	Some magnetism, can rust under extreme exposure
3c-SA	304/305, SS anti-magnetic, resistant to hydrochloric and nitric acids, nonrusting, blunter tips	Softer tips
3c-PB	Phosphorous Bronze nonmagnetic, non-sparking, medium-strong tips	Tend to discolor
3c-N	Nonmagnetic, nickel, nonscratching	Very soft tips
3c-TA	Titanium withstands 1,000 °F, zero magnetic retention	In OPTIMA only

### Coating Materials and Grades of Quality

- TC-Teflon (formerly EF-Teflon) green coating available
- Available in 1.5 mm, 3 mm and 5 mm
- 12-pc. minimum
- Coatings on carbon and stainless steel are not recommended

EXCELTA offers 5 grades of quality to service all your tweezer requirements. See chart below.

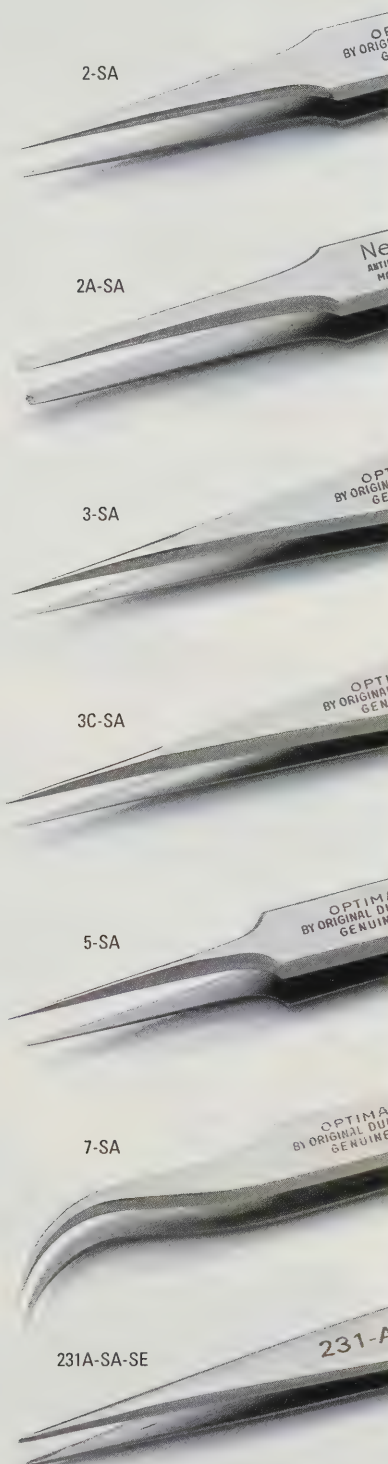
Grade	P/N	Suffix	Brand	Description
5	ALT	*****	ALTIMA	The highest quality, precision finish, made in Switzerland
4	OPT	****	OPTIMA	High quality, NEVERUST®, made in Switzerland
3	EXC	***	EXCELTA	Best quality, made in Switzerland
2	PRE	**	PRECISTA Switzerland	Good quality, competitive price
	PI	**	PRECISTA Italy	
1	SEL	*	SELECTA	Economy tweezers, lowest price

NOTE: Not all models are available in all grades.

Must indicate complete part number with correct suffix to receive the proper quality level tweezer. Example, 1-SA-OPT\*\*\*\*, 1-SA-EXC\*\*\*, 1-SA-PRE\*\*, 1-SA-SEL\*.

NOTE: Please use appropriate suffix code for coating required (Example 2A-SA-TC).

## EXCELTA's Most Popular Tweezers for the Electronic's Industry



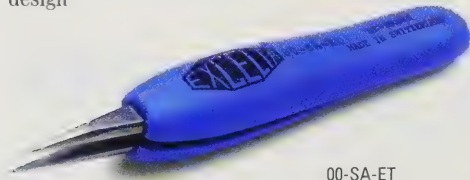
P/N	Description	Grade	1-24	25+
2-SA-OPT	4-1/2" NEVERUST material, medium tapered precision point	4	\$26.15	\$23.95
2-SA-EXC	4-1/2" SA material, medium tapered precision point	3	18.75	17.15
2-SA-PRE	4-1/2" SA material, medium tapered precision point	2	14.20	13.05
2-SA-SEL	4-1/2" SA material, medium tapered	1	5.15	4.70
2A-SA-OPT	4-1/2" material, flat rounded tips	4	26.15	23.95
2A-SA-EXC	4-1/2" SA material, flat rounded tips	3	15.20	13.90
2A-SA-PRE	4-1/2" SA material, flat rounded tips	2	12.70	11.65
2A-SA-SEL	4-1/2" SA material, flat rounded tips	1	5.15	4.70
3-SA-OPT	4-3/4" NEVERUST material, precision point	4	26.15	23.95
3-SA-EXC	4-3/4" SA material, precision point	3	18.45	16.90
3-SA-PRE	4-3/4" SA material, precision point	2	14.50	13.30
3-SA-SEL	4-3/4" SA material	1	5.15	4.70
3C-SA-OPT	4-1/4" NEVERUST material, precision point	4	26.15	23.95
3C-SA-EXC	4-1/4" SA material, precision point	3	17.65	16.20
3C-SA-PRE	4-1/4" SA material, precision point	2	15.20	13.90
3C-SA-SEL	4-1/4" SA material	1	5.15	4.70
5-SA-OPT	4-1/4" NEVERUST material, micro-fine precision tips	4	31.80	29.15
5-SA-EXC	4-1/4" SA material, micro-fine precision tips	3	19.15	17.55
5-SA-PRE	4-1/4" SA material, micro-fine precision tips	2	15.45	14.15
5-SA-SEL	4-1/4" SA material, micro-fine	1	5.15	4.70
7-SA-OPT	4-3/4" SA NEVERUST material, curved precision tips	4	36.75	33.70
7-SA-EXC	4-3/4" SA material, curved precision tips	3	20.50	18.80
7-SA-PRE	4-3/4" SA material, curved precision tips	2	18.45	16.90
7-SA-SEL	4-3/4" SA material, curved tips	1	5.15	4.70
231-SA-SE	4-3/4" general-purpose serrated tips	1	5.15	4.70
231A-SA-SE	4-3/4" general-purpose smooth tips	1	5.15	4.70



**EXCELTA ERGO-TWEEZ™ Tweezers**

These tweezers feature a soft-foam cushion grip that is specially designed to combat operator fatigue and carpal-tunnel syndrome.

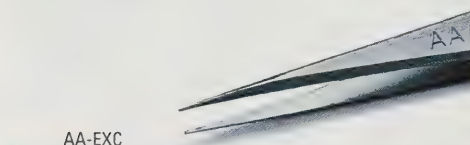
- Acts as a heat shield • Ergonomic design



P/N	Description	1-24	25+
2A-SA-ET	ERGO-TWEEZ tweezers	\$19.80	\$18.15
3C-SA-ET	ERGO-TWEEZ tweezers	22.90	20.95
5-SA-ET	ERGO-TWEEZ tweezers	24.45	22.45
7-SA-ET	ERGO-TWEEZ tweezers	25.80	23.65
00-SA-ET	ERGO-TWEEZ tweezers	20.60	18.90

**EXCELTA BOLEY Style Straight Tweezers**

- Economical, general-purpose tweezers
- Flame-hardened tips



P/N	Description	Grade	1-24	25+
AA-EXC	5", carbon steel, general-purpose, hard tips	3	\$12.10	\$11.10
AA-PRE	5", carbon steel, general-purpose, hard tips	2	11.40	10.45
AA-SEL	5", carbon steel, general-purpose, hard tips	1	5.15	4.70
AA-S-EXC	5", stainless steel, general-purpose tweezers	3	13.60	12.45
AA-SA-EXC	5", SA material, boley style, straight point	3	14.20	13.05
AA-SA-PRE	5", SA material, boley style, straight point	2	12.20	11.20
AA-SA-SEL	5", SA material, boley style, straight point	1	5.15	4.70

**EXCELTA Sturdy Precision Assembly Tweezers**

P/N	Description	Grade	1-24	25+
00-EXC	4-3/4"; carbon steel; smooth, slim tips	3	\$16.45	\$15.05
00-SEL	4-3/4"; carbon steel; smooth, slim tips	1	5.15	4.70
00-SA-EXC	4-3/4"; SA material; smooth, strong tips	3	15.30	14.00
00-SA-PRE	4-3/4"; SA material; smooth, strong tips	2	12.20	11.20
00-SA-SEL	4-3/4"; SA material; smooth, strong tips	1	5.15	4.70

**EXCELTA ESD-Safe CARBOFIB™ Tweezers**

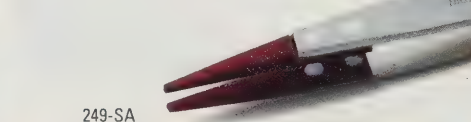
- Protect against ESD damage, nicking, scratching, marring



P/N	Description	Grade	1-24	25+
149A	4" long, 4-mm tip	3	\$33.90	\$31.10
159A	5" long, 4-mm tip	3	32.40	29.70
149B	4" long, 1-mm tip	3	32.50	29.80
159B	5" long, 1-mm tip	3	30.90	28.35
149C	4" long, 2-mm tip	3	30.30	27.75
159C	5" long, 2-mm tip	3	28.90	26.50

**EXCELTA VULCANFIB™ Soft-Tip Handling Tweezers**

- Reduces nicking and marring of delicate wires and component leads • ESD-safe



P/N	Description	Grade	1-24	25+
249-SA	5" soft-tip handling tweezers	3	\$28.10	\$25.75
148A	4" long, 2-mm tip	3	30.30	27.75
158A	5" long, 2-mm tip	3	30.30	27.75
148B	4" long, 3-mm tip	3	29.30	26.90
158B	5" long, 3-mm tip	3	29.30	26.90

**EXCELTA Angulated-Head Cutting Tweezers**

- Most common cutting tweezers design in use today • Designed to safely cut soft copper, gold, silver, and magnetic wire up to .010" in diameter
- Flat blades



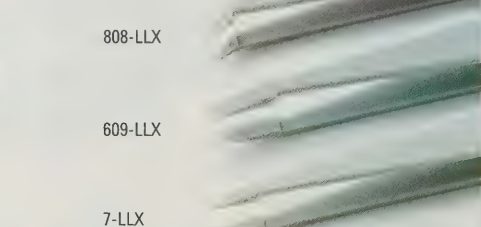
P/N	Description	Grade	1-24	25+
15A-GW-OPT	4-1/2" tweezers	4	\$70.30	\$64.45
15A-GW-EXC	4-1/2" tweezers	3	42.60	39.05
15A-GW-PRE	4-1/2" tweezers	2	38.75	35.50
15A-GW-PI	4-1/2" tweezers	1	25.70	23.60

**EXCELTA LERLOY® Plastic Tweezers**

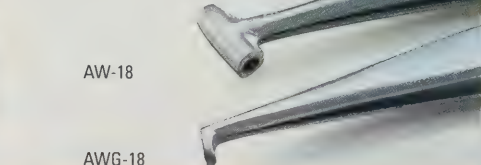
**7-LLX:** • Designed to handle precision micro-miniature parts

**808-LLX:** • Specially designed for maximum visibility (9/16" when closed) • Ideal for handling small semiconductors and parts in confined areas

**609-LLX:** • Ideal for use with chips, delicate wafers, etc. • Overall measurements: 4-9/16" long by 7/16" body, tapering down to .008" thick by 3/32" wide at tweezer tips



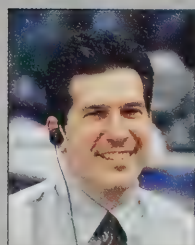
P/N	Description	1-24	25+
7-LLX	Overall measurements: 4-9/16" long by 7/16" at body	\$1.70	\$1.60
7A-LLX	Same as 7, but anti-static material	2.90	2.70
808-LLX	Angled-point tweezer	2.30	2.15
609-LLX	Broad-tip tweezer	1.70	1.60
609A-LLX	Same as 609, but antistatic material	2.90	2.70

**CLAUSS Antiwicking Tools**

P/N	Length	Conductor Contact	1-24	25+
AW-18	5"	.0625	\$29.25	\$27.20
AW-24	5"	.03125	29.25	27.20
AWG-18	4-1/2"	.0625"	24.40	22.70

NOTE: The AWG-18 comes with an L-shaped head which affords greater visibility and facilitates working in tightly confined solder areas.

NOTE: Stock numbers give the correct AWG size intended for use with each tool (for example, AW-18 is for 18 AWG).



Have a Question?  
Call Us.



## XCELITE SERIES 99® Compact Interchangeable-Blade Sets

Series 99 service kits and sets are made up of various screwdriver, nutdriver, and other blades which can be used interchangeably in Series 99 handles. All blades are high-carbon steel with highly polished finish except BRISTOL and ALLEN hex. types which are precision-formed, cold-drawn, case-hardened steel. Plastic handles have patented spring device that holds blades firmly, yet permits quick, easy insertion and removal. Regular handles accommodate all blades: single and reversible. Stubby, tee, and ratchet handles can be used

only with single-end blades. The Series 99 blades, shanks, and handles are all available separately.



P/N	Description	1-11	12+
99-PS-40	11-pc. ALLEN hex. socket-type screwdriver set	\$37.30	\$33.15
99-PS-40BP	11-pc. ballpoint ALLEN hex. socket type screwdriver set	56.20	49.95
99-PS-50	13-pc. screwdriver and nutdriver set	47.10	41.85
99-PS-60	11-pc. BRISTOL multispline socket type screwdriver set	37.30	33.15

## XCELITE Screwdriver Set for Hex Socket Screws

This 9-piece kit contains:

- 8 hex. screwdriver blades: .028", .035", .050", 1/16", 5/64", 3/32", 7/64", 1/8"
- Torque amplifier handle and plastic carrying case



P/N	Description	1-11	12+
PS-89	9-pc. hex. socket screwdriver set	\$22.45	\$19.30

## XCELITE Color-Coded Hollow-Shaft Nutdriver Kit

- This 10 pc. set contains hollow-shaft driver numbers: HS-6, HS-7, HS-8, HS-9, HS-10, HS-11, HS-12, HS-14, HS-16, and HS-18
- Sturdy yellow plastic case



P/N	Description	1-11	12+
HS-6-18	10-pc. nutdriver kit, hollow shaft	\$51.20	\$45.50

## XCELITE Nutdriver Set

This 11-piece set contains:

- 10 nutdrivers: 3/32", 1/8", 5/32", 3/16", 7/32", 1/4", 9/32", 5/16", 11/32", 3/8"
- All handles color-coded
- Torque-amplifier handle
- Plastic case



P/N	Description	1-11	12+
PS-120	11-pc. nutdriver set, inch sizes, color-coded handles and case	\$30.25	\$26.95

## XCELITE Screwdriver/Nutdriver Set

This 11-piece set contains:

- 3 slotted screwdrivers: 1/8", 3/16", 1/4"
- 2 PHILLIPS: #1, #2
- 5 nutdrivers: 3/16", 1/4", 5/16", 11/32", 3/8"
- Torque-amplifier handle
- Plastic case



P/N	Description	1-11	12+
PS-130	11-pc. complete screwdriver and nutdriver set, inch sizes, color-coded handles and case	\$31.30	\$27.85

## XCELITE Screwdriver Set

This 9-piece set contains:

- 5 slotted screwdrivers: 3/32", 1/8", 5/32", 3/16", 1/4"
- PHILLIPS: #0, #1, #2
- All handles color-coded
- Torque-amplifier handle
- Plastic case



P/N	Description	1-11	12+
PS-88	9-pc. screwdriver set, color-coded handles and case	\$24.00	\$21.35

## XCELITE SERIES 99 Personal-Computer Repair Kit

- 13 antistatic chip tools, protect chips from ESD damage
- PHILLIPS screwdriver blade (#0, #1)
- Slotted screwdriver blade (3/16")
- 2 TORX screwdriver blades
- Hex. nutdriver shank (3/16", 1/4")
- Regular handle
- 3-prong chip retriever/extractor, chip tweezers, chip inserter, chip extractor
- Roll-up pouch



P/N	Description	1-11	12+
99-SPC	13-piece computer repair kit	\$38.15	\$34.00

## XCELITE SERIES 99 Service Master Kit

This 23-piece kit contains:

- 6" long-nose pliers
- 5" diagonal cutters
- 6" adjustable wrench
- Regular and stubby handle
- Slotted screwdriver blades: 3/16", 1/4"
- PHILLIPS blades: #1, #2
- 9 nutdrivers: 3/16"-1/2"
- Stubby nutdriver blades: 3/8", 5/16", 1/4"
- 7" extension
- Reamer
- Canvas case



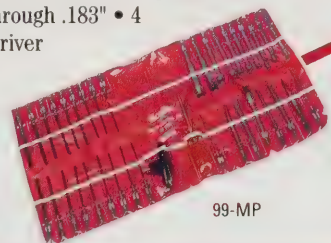
P/N	Description	1-11	12+
99-SM	23-pc. service-master kit	\$138.50	\$122.95

## XCELITE SERIES 99 Multi-Purpose Tool Kit

This 39-piece kit contains:

- Regular and tee handles
- 1/4" magnetic nutdriver blade
- 9 hex. nutdriver shanks: 3/16"-1/2"
- 9 ALLEN hex. blades .050, 1/16"-3/16"
- 9 BRISTOL spline blades .048" through .183"
- 4 slotted-screwdriver blades: 1/8"-5/16"

- PHILLIPS blades: #0, #1, #2
- Reamer
- 4" extension
- Canvas case



P/N	Description	1-11	12+
99-MP	39-pc. multi-purpose tool kit	\$160.65	\$142.55

## XCELITE SERIES 99 Screwdriver and Nutdriver Set for Cordless Screwdrivers

- Stubby nutdriver (3/16", 7/32", 1/4", 9/32", 5/16", 11/32", 3/8")
- Stubby slotted screwdriver (3/16", 1/4")
- Stubby PHILLIPS screwdriver (#1, #2)
- Cordless screwdriver adapter
- Vinyl carrying pouch



P/N	Description	1-11	12+
99-PA-50	12-pc. screwdriver and nutdriver set	\$19.40	\$17.25



## XCELITE Series 99 Handles and Blades

• Interchangeable blades, shanks, and handles are all available separately allowing gradual accumulation of whatever items might be needed for individual requirements • Modular design also permits users of series 99 sets to add or substitute tools as necessary at minimal cost

## XCELITE Series 99 Handles

Regular, tee, and ratcheting handles are available for a wide range of applications. Ratcheting handles permit extremely simple one-hand operation, even in tight quarters • Features include: silent operation; smooth, precise action; and left-right-neutral marking indicator

• Light-ratcheting drag facilitates turning and prevents fasteners from reversing



P/N	Description	1-11	12+
99-1	Amber 1-3/16" x 4-1/8"-Regular handle	\$3.70	\$3.35
99-2	Amber 1-1/16" x 3-1/8"-Junior handle	3.55	3.20
99-4	Black 3-1/2" x 1-5/8"-Tee handle	4.80	4.35
99-1-R	Black 1-3/16" x 5-1/4"-Regular handle	24.75	22.00
99-4-R	Black 3-1/2" x 2-1/2"-Tee ratcheting handle	24.75	22.00

## XCELITE Series 99 Nutdriver Blades

P/N	Description	ID/Blades	1-11	12+
99-6	3-5/8" nutdriver blades	3/16"	\$3.50	\$3.15
99-7	3-5/8" nutdriver blades	7/32"	3.50	3.15
99-8	3-5/8" nutdriver blades	1/4"	3.50	3.15

## XCELITE Series 99 Screwdriver Blades

P/N	Description	ID/Blades	1-11	12+
99-125	4" screwdriver blades	1/8"	\$3.50	\$3.15
99-811	4" screwdriver blades	3/16"	3.50	3.15
99-820	4" Phillips blade	# 0	3.50	3.15
99-821	4" Phillips blade	# 1	3.50	3.15

## XCELITE Series 99 4" ALLEN Hex. Socket Drivers

P/N	Size	1-11	12+
99-20	.050"	\$3.15	\$2.85
99-21	1/16"	3.15	2.85
99-22	5/64"	3.15	2.85

NOTE: Also available in metric sizes.

## XCELITE Series 99 4" Ballpoint ALLEN Hex. Socket Drivers

P/N	Size	1-11	12+
99-21BP	1/16"	\$5.35	\$4.85
99-22BP	5/64"	5.35	4.85
99-23BP	3/32"	5.35	4.85

NOTE: Also available in metric sizes

## XCELITE Series 99 4" BRISTOL 6-Flute Multiple-Spline Drivers

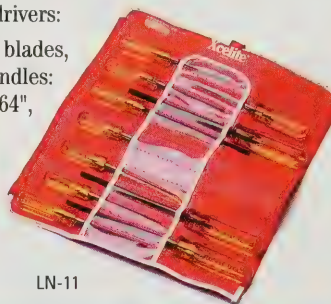
P/N	Size	1-11	12+
99-61	.048"	\$3.15	\$2.85
99-62	.060"	3.15	2.85

## XCELITE Roll-Up Kit for ALLEN Hex. Socket Drivers

This 11-piece kit contains the following drivers:

• 11 LN series blades, shanks and handles: .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32", 1/4"

• Plastic-coated vinyl case



P/N	Description	1-11	12+
LN-11	11-pc. roll-up kit for ALLEN hex. sockets	\$46.90	\$41.75

## XCELITE Full Hollow Shaft Nutdrivers with Fixed Color-Coded Handles

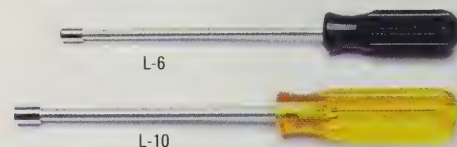
• Made with steel shafts and precision-machined, cold-drawn, case-hardened sockets with bright finish • Plastic handles are color-coded for easy size identification • 7" hole depth, 3-1/8" shaft length, 7" overall length



P/N	Description	ID	1-11	12+
HS-6	Black	3/16"	\$4.65	\$4.20
HS-8	Red	1/4"	4.65	4.20
HS-11	Green	11/32"	4.95	4.45
HS-12	Blue	3/8"	4.95	4.45

## XCELITE Extra Long Full Hollow Shaft Nutdrivers with Color-Coded Handles

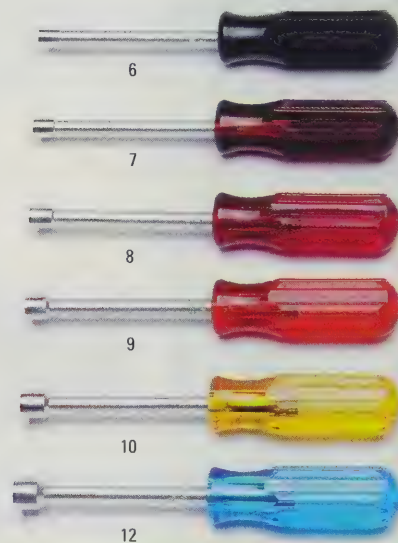
• Made with steel shafts and precision-machined, cold-drawn, case-hardened sockets with bright finish • Plastic handles are color-coded for easy size identification • 9" hole depth, 6" shaft length, 10" overall length



P/N	Color Code	ID	1-11	12+
L-6	Black	3/16"	\$5.75	\$5.15
L-10	Amber	5/16"	5.75	5.15

## XCELITE Regular-Drilled Shaft Nutdrivers with Color-Coded Handles

• Made with steel shafts and precision-machined, cold-drawn, case-hardened sockets with bright finish • Plastic handles are color-coded for easy size identification • 1-1/8"-1-7/8" hole depth, 3" shaft length, 6-1/8"-7" overall length



P/N	Description	ID	1-11	12+
6	Black	3/16"	\$4.10	\$3.65
7	Brown	7/32"	4.10	3.65
8	Red	1/4"	4.10	3.65
9	Orange	9/32"	4.10	3.65
10	Amber	5/16"	4.10	3.70
12	Blue	3/8"	4.30	3.90

**FAX** We accept fax orders 24 hours a day, 7 days a week.



We provide world-class quality ISO-9002-certified services and facilities.

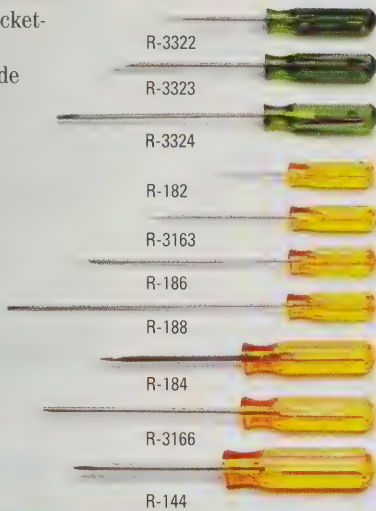


We provide telephone technical assistance with your purchases.



## XCELITE Screwdrivers for Slotted Screws

- Except where noted, all blades are AISI 6 150 chrome-vanadium steel
- Pocket-clip style, round blade
- Regular round blade



P/N	Blade Length	Tip Width	Overall Length	1-11	12+
R-3322	2"	3/32"	4-1/4"	\$1.90	\$1.60
R-3323	3"	3/32"	5-1/4"	2.10	1.80
R-3324	4"	3/32"	6-1/4"	2.25	1.95
R-182	2"	1/8"	4-5/8"	2.25	1.95
R-184	4"	1/8"	6-5/8"	2.90	2.50
R-186	6"	1/8"	8-5/8"	3.15	2.70
R-188	8"	1/8"	10-5/8"	3.40	2.90
R-3163	3"	3/16"	6-5/8"	3.65	3.15
R-3166	6"	3/16"	9-5/8"	4.60	3.90
R-144	4"	1/4"	8-1/8"	4.80	4.15

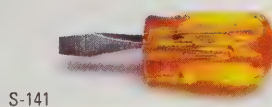
## XCELITE Round-Blade Slotted Screwdriver Sets



P/N	Description	1-11	12+
SDR-11	Contains 5 round-blade screwdrivers for slotted screws (catalog numbers: R182, R5324, R3166, R144 and R5166)	\$20.65	\$17.75

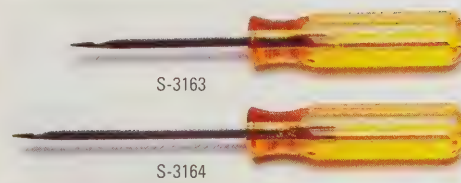
NOTE: Also available in square blades.

## XCELITE Square-Blade Stubby Screwdrivers



P/N	Blade Length	Overall Length	1-11	12+
S-141	1-1/4"	3-1/4"	\$4.10	\$3.50

## XCELITE Square-Blade Regular Screwdrivers



P/N	Blade Length	Tip Width	Overall Length	1-11	12+
S-3163	3"	3/16"	6-5/8"	\$3.85	\$3.30
S-3164	4"	3/16"	7-5/8"	4.30	3.70

NOTE: Also available in stubby screwdrivers.

## XCELITE Screwdrivers for Recessed-Head Screws

- Pocket-clip-style, PHILLIPS-type



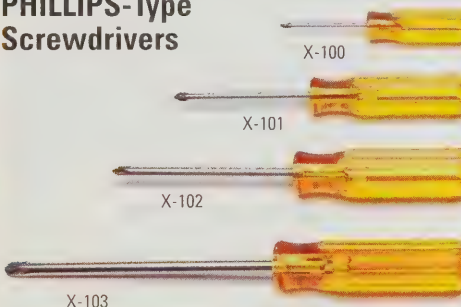
P/N	Point Size	Blade Length	Overall Length	1-11	12+
P-12-S	0	2"	4-1/4"	\$2.45	\$2.25

## XCELITE Stubby PHILLIPS-Type Screwdrivers



P/N	Point Size	Blade Length	Overall Length	1-11	12+
SX-101	1	1-7/16"	3-7/16"	\$4.05	\$3.50
SX-102	2	1-5/16"	3-3/8"	4.55	3.90

## XCELITE Regular PHILLIPS-Type Screwdrivers



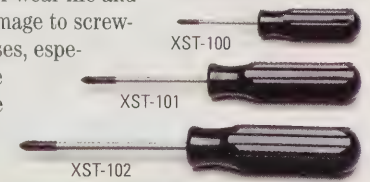
P/N	Point Size	Blade Length	Overall Length	1-11	12+
X-100	0	2"	4-5/8"	\$2.75	\$2.35
X-101	1	3"	6-5/8"	3.65	3.10
X-102	2	4"	8-1/8"	4.85	4.15
X-103	3	6"	10-1/2"	6.75	5.80



Products with this symbol are some of our most popular and best priced.

## XCELITE Super-Tru-Tip PHILLIPS-Type Screwdrivers

- Bright nickel chrome blades specially treated and finished with black oxide for better control
- The closer fit of the Super-Tru tips provides a much longer wear life and reduces damage to screw-head recesses, especially in the smaller-size fasteners



P/N	Point Size	Blade Length	Overall Length	1-11	12+
XST-100	0	2"	4-5/8"	\$3.45	\$2.95
XST-101	1	3"	6-5/8"	4.75	4.10
XST-102	2	4"	8-1/8"	6.10	5.25

## XCELITE PHILLIPS Screwdriver Sets

- 5 pieces (all PHILLIPS point sizes: #0, #1, #2, #3): P/Ns X-100, X-101, X-102, X-103, SX-102 • Comes with vinyl case



P/N	Description	1-11	12+
SDX-22	5-piece PHILLIPS	\$22.45	\$19.90

## XCELITE Super-Tru-Tip PHILLIPS Screwdriver Set

- 5 pieces (all Super-Tru tip PHILLIPS): P/N's XST-100, XST-101, XST-102, XST-1010, and XST-1020
- Comes with vinyl case



P/N	Description	1-11	12+
XST-5	5-pc. Super-Tru-Tip PHILLIPS	\$29.75	\$25.65

## XCELITE Slotted and PHILLIPS Combo Screwdriver Set

- 6 pieces: 4 round blades for slotted screws (P/Ns R-184, R-3166, R-144, R-5166) and 2 PHILLIPS-types (P/Ns: X-101 and X-102)
- Vinyl case



P/N	Description	1-11	12+
SRX-33	6-piece set	\$28.00	\$24.10



**XCELITE 4-In-1 Screwdriver**

- Self-storing standard-shaft screwdriver • Tips: 3/16" or 1/4" slotted and #1 or #2 PHILLIPS type



P/N	Description	1-11	12+
FSD-1	Four-in-one screwdriver	\$9.40	\$8.40

**CRESCENT Cushion-Grip Screwdrivers**

- Tapered, ergonomically-designed cushion grips
- Oversized handles assure better grip and more turning power
- Heavy-duty steel-alloy chrome-plated blades have precision crossground flats and edges
- All tips vapor-blasted to prevent chipping



P/N	Blade Length	Tip Width	Overall Length	1-11	12+
2143-3	3" slotted	1/4"	6-3/4"	\$4.45	\$3.30
2143-4	4" slotted	1/4"	8-3/8"	4.70	3.50

**CRESCENT Genuine PHILLIPS Screwdrivers**

P/N	Point Size	Blade Length	Overall Length	1-11	12+
2501	1	3"	6-3/4"	\$4.10	\$3.05
2502	2	4"	8-3/8"	4.55	3.35

**XCELITE Precision Electronics Screwdrivers**

These screwdrivers are designed for maximum control, accuracy, and durability. The 4-piece set includes 3 slotted screwdrivers (1.5", 2.5", 3.0") and 1 PHILLIPS (#0). The 7-piece set includes the above items plus a 2" slotted screwdriver and 2 PHILLIPS (#00, #1).

- Chrome-molybdenum vanadium steel blades
- Fast-turning swivel caps—with cavity for precise centering
- Precision-tolerance black tips
- No-roll handle design



P/N	Description	List	Each
XP-400	4-piece set	<del>\$17.60</del>	\$11.95
XP-700	7-piece set	<del>21.75</del>	19.95

**BONDHUS® BALLDRIVER® Tool Sets**

BONDHUS L-wrench sets are ideal when a variety of tool sizes are required. All sets are packaged in a key case. The wrenches slip easily into individually-marked slots and lock securely into place with a twist.

- Compact • Angle entry to 25°
- Industrial-quality hardened steel



P/N	Sizes in Set	1-9	10-24	25+
10932	.050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32"	\$8.00	\$7.45	\$7.00
10936	.050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16", 7/32", 1/4", 5/16"	11.60	10.35	9.85
10945	5/64", 3/32", 7/64", 1/8", 9/64", 5/32", 3/16"	7.60	7.20	6.70
10946	Metric: 1.5 mm, 2 mm, 2.5 mm, 3 mm, 4 mm, 5 mm	6.30	5.55	5.25
10999	Metric: 1.5 mm, 2 mm, 2.5 mm, 3 mm, 4 mm, 5 mm, 6 mm, 8 mm, 10 mm	13.50	12.35	11.35

**ALLEN 1/4"-Drive Socket Sets**

- Quick-release teardrop ratchet
- Sturdy metal box
- Lifetime warranty
- Made in USA



P/N	Description	Each
19011	21-piece set, standard and deep sockets, 1-1/2" and 6" extensions, quick-release ratchet	\$94.10
19001	13-piece set, standard sockets, 1-1/2" and 6" extensions, quick-release ratchet	57.50
19016	14-piece metric set, standard sockets, 1-1/2" and 6" extensions, quick-release ratchet	60.65

NOTE: Call for complete tool list.

**ALLEN Midget Wrench Sets**

- Nickel-chrome finish provides lifetime corrosion resistance
- Made in USA

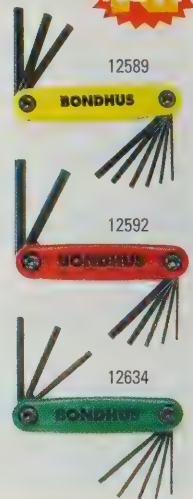


P/N	Description	Each
29015	Midget combination wrenches, 10-piece set, 6- and 12-point, pouch	\$31.00
29121	Midget open-end wrenches, 8-piece set, 15° and 80°, pouch	29.75
29019	Metric midget combination wrenches, 10-piece set, 6- and 12-point, pouch	30.60

NOTE: Call for complete tool list.

**BONDHUS GORILLA GRIP™ Fold-Up Tools**

GORILLA GRIP fold-up tools feature: • Space-age composite handle, "stronger than steel" • PROTANIUM™ high-torque steel—25% stronger than competition • Light-weight ergonomic design • Turn-and-flip feature means not having to disengage tool from fastener when working up against walls or other obstructions • 90° stop feature converts tool into nonstop, time-saving spin wrench



P/N	Description	1-9	10-24	25+
12589	9-piece fractional set, 5/64"-1/4"	\$5.10	\$4.75	\$4.45
12592	7-piece metric set, 1.5 mm-6 mm	4.15	3.85	3.60
12634	8-piece star recessed set, T9-T40	9.90	9.20	8.60

**THE REMLINE Metal Tool Boxes**

These sturdy red enamel metal toolboxes come with steel handles and full-length piano hinges.



P/N	Description	1-9	10-24	25+
4011-RL	11-1/8" (L) x 7-1/16" (W) x 7-1/4" (H), welded hip roof, no tray	\$21.70	\$19.55	\$18.35
4111-RL	11-1/8" (L) x 7-1/16" (W) x 7-1/4" (H), welded hip roof, cantilever tray	31.30	29.50	27.75
4013-RL	13-1/8" (L) x 7-1/16" (W) x 7-1/4" (H), welded hip roof, no tray	22.00	19.80	18.65
4113-RL	13-1/8" (L) x 7-1/16" (W) x 7-1/4" (H), welded hip roof, cantilever tray	33.40	30.10	28.25

**AKRO MILS Lightweight Polypropylene Tool Boxes**

- Strong, lightweight boxes with ample storage for a variety of tools and supplies
- Convenient lift-out tray (black)
- Full interlocking hinges, security latch, padlock eye
- Designed to provide a barrier against dust and moisture



P/N	Description	1-9	10-24	25+
09-013	13" (L) x 7" (W) x 6" (H), red	\$10.55	\$9.00	\$8.25
09-916	16" (L) x 8" (W) x 7" (H), red	18.30	17.00	15.85



## CRESCENT® TOOLZALL™ Multipurpose Tools

The TOOLZALL gives you an entire toolbox in 1 convenient package.

Features	TZ3	TZ2	TZ1D
Heavy-Duty Pliers Jaw	•		
Needle-Nose/Regular Pliers	•	•	•
Wire Cutter	•	•	•
Wire Crimper	•		
Saw	•		
Knife Blade	•		
Drop-Point Blade		•	•
Serrated Sheepfoot Blade		•	
Large Slotted Screwdriver	•	•	•
Medium Slotted Screwdriver	•	•	•
Small Slotted Screwdriver	•		•
#1 PHILLIPS Screwdriver	•	•	•
Awl	•		•
Can/Bottle Opener	•	•	•
Lanyard	•	•	
File	•	•	•
Ruler	•	•	•
Sheath	•	•	•
Limited Lifetime Warranty	•	•	•

- Includes tools most commonly used by professionals • 3 models to choose from • Made from the highest quality stainless steel for longer life
- Made in USA • Limited lifetime warranty

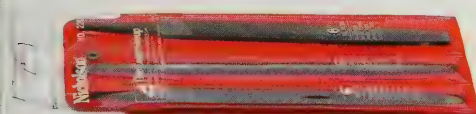


TZ3

P/N	Description	Each
TZ3	TOOLZALL PRO XL	\$59.00
TZ2	TOOLZALL PRO <b>SAVE</b> List: 44.00	39.95
TZ1D	TOOLZALL with comfort grips	35.00

## NICHOLSON 3-File Pack

Set contains: • 6" slim-taper file • 6" round file • 6" mill bastard file • Plastic pouch



22015

P/N	Description	1-11	12+
22015	3-file pack	\$15.05	\$11.45

## LEATHERMAN® Pocket Tools

### 12-In-1 Tool

This multi-purpose tool weighs only 5 oz yet it contains 12 tools (needle-nose pliers, regular pliers, wire cutters, knife, file, 8" ruler, can/bottle opener, small screwdriver, medium screwdriver, large screwdriver, PHILLIPS driver, awl/punch).

- 100% stainless steel • "Fan-handle" pliers are full size (6-1/4") • All parts are connected • Posi-stop safety feature prevents accidental blade closure
- Special eyelet for lanyard attachment • Comes with leather belt sheath

### PST II™ Tool

The PST II is built around the full-size, full-strength pliers that made the original LEATHERMAN tools so popular.

- Strongest, most useful scissors found in any multi-purpose tool • Upgraded file includes diamond coating and unique sharpening groove
- Wire cutters are engineered to cut even harder grades of wire • Combination straight/serrated edge makes the knife blade more versatile
- Weighs only 5 oz

### micra® Tool

The micra combines advanced technical design with high-quality stainless steel to give you a tool with incredible utility for its size.

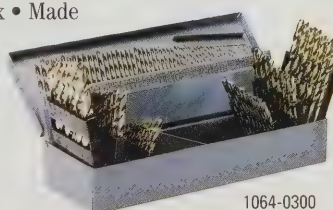
- Closes to only 2-1/2" and weighs less than 2 oz
- Contains scissors, knife, tweezers, nail file/cleaner, flat PHILLIPS screwdriver, medium screwdriver, small screwdriver, bottle opener, ruler, and lanyard attachment • Scissors designed with innovative spring mechanism for smooth cutting action



P/N	Description	1-4	5-9	10+
61010101	12-in-1 tool	\$50.00	\$46.80	\$43.65
61070101	PST II tool	60.00	53.85	50.00
64010101	micra® tool	27.00	25.15	23.40

## High-Speed Steel-Drill-Bit Sets

- High-speed straight shank
- Metal index • Made in USA



1064-0300

P/N	Description	Each
1064-7084	21-pc. set 1/16 to 3/8 by 64ths	\$39.95
1064-0180	26-pc. set A-Z letter size	51.95
1064-0300	115-pc. set 1/16 to 1/2 by 64ths, A-Z and 1 to 60	139.00

## UTICA Torque-Limiting Screwdrivers

- Offer the most reliable means of tightening small threaded fasteners • When desired torque is reached, the screwdriver spins freely to prevent further torquing on the fastener • Limits torques in both right- and left-hand directions

### Adjustable Models

- Calibrated micrometer scale
- Patented spring-loaded locking mechanism
- 1/4" female Hex drive



TS30

### Miniature Torque-Limiting Screwdrivers

- Miniature model offers the most reliable means of tightening small threaded fasteners • Control mechanism engages and disengages 4 times during each revolution of the handle in either direction • Universal drive
- 3-5/8" length



TT-1

P/N	Range	Increments	1-2	3+
TS30	1-30 in/lb	1 in/lb	\$183.25	\$137.45
TT-1	.25-20 in/oz	1/4 in/oz	200.40	150.30

## UTICA Standard Torque Screwdriver Kits

- 2 in/oz to 100 in/oz
- 41 pieces • Range: 1 in/lb to 30 in/lb



Kit-3

Description	Qty.	Size/Type
Torque Screwdrivers	1	TS-100, TS-30
Hex. Keys	1	.028", 3/32", 1/8", 5/32"
Sockets	1	3/32", 1/8", 5/32", 1/4", 5/16"
Screwdrivers Bits	1	.080", .214", .250"
PHILLIPS	1	#2
Hex. Keys	2	.035", .050", 1/16", 5/64"
Sockets	2	7/64", 3/16"
Screwdriver Bits	2	.100", .134", .185"
PHILLIPS	2	#0, #1
Adapters	2	HW-18, HW-19

P/N	Description	1-2	3+
Kit-3	Torque-screwdriver kit	\$573.65	\$430.25

NOTE: More kits and accessories are available, such as slotted bits, TORX bits, adaptors and bit holders.



## UTICA Micrometer-Adjustable and Single-Setting (Preset) Torque Wrenches

- Same action as square-drive torque wrenches
- Interchangeable heads • Common-center principle allows heads to be replaced or exchanged without the need for recalibration • Single-setting wrenches do not have a scale and are set on a torque tester • Range: 30–150 in/lb in 1-lb graduations

NOTE: When ordering single-setting preset-torque wrenches, please specify the torque-setting range (5–100 in/lb or .5–8 ft/lb).



P/N	Description	1-5	6-11	12+
CH150	Micrometer-adjustable wrench	\$145.20	\$108.90	\$99.00
CHA-5	Single-setting pre-set wrench	82.05	61.55	56.40

## UTICA Interchangeable Heads, "A"-Size Series

The following heads fit both the CH150 and the CHA-5 torque wrenches. Many more sizes are available up to 3/4".



P/N	Description	1-5	6-11	12+
RS82	1/4" ratcheting square drive	\$44.15	\$33.15	\$29.90
RS122	3/8" ratcheting square drive	45.35	34.00	30.65
OP122	3/8" open-end wrench	35.45	26.60	23.90
OP162	1/2" open-end wrench	35.45	26.60	23.90
LB122	3/8" box wrench	42.40	31.80	29.65
HX82	1/8" hex. key	43.15	32.40	30.15

## UTICA TCI Series Micrometer (Click) Torque-Sensing Plain- and Ratcheting-Head Wrenches

- Pull and click to set torque with micrometer accuracy • Fast, accurate, and simple • No dials, pointers, or handles • Accuracy  $\pm 4\%$  right-hand (clockwise) and  $\pm 6\%$  left-hand (counter-clockwise)



TCI-150RA

### Ratchet-Head Model (30–150 in/lb)

P/N	Drive Size	Length	1-5	6-11	12+
TCI-150RA	1/4"	9-1/2"	\$150.60	\$112.95	\$101.70

### Plain-Head Models (30–150 in/lb)

P/N	Drive Size	Length	1-5	6-11	12+
TCI-150-3/8	3/8"	9"	\$138.10	\$103.60	\$93.25

## STURTEVANT RICHMONT Adjustable Torque-Limiting Screwdriver

- Range: 2–36 in/lb (.2–4 Nm) in 2 in/lb (.2 Nm) graduations • Grip diameter: 1-3/8"
- Weight: 8 oz



Emcal-36/4

P/N	Drive Size	Length	1	2-9	10+
Emcal-36/4	1/4"	7-3/4" (less bit)	\$188.00	\$144.70	\$107.10

## STURTEVANT RICHMONT Adjustable-Torque-Screwdriver Kit

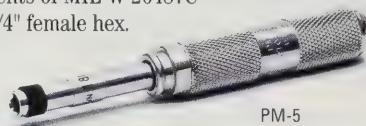
CAL 36/4 screwdriver, case, and 1 each of the following bits:

Hex. 5/64	Slotted 5–6	PHILLIPS #0	TORX T40
Hex. 3/32	Slotted 8–10	PHILLIPS #1	Square
Hex. 7/64	Slotted 12/14	PHILLIPS #2	Recess 0
Hex. 1/8	Square	PHILLIPS #3	Square
Hex. 9/64	Recess 1	TORX T 10	Recess 2
Posidrive #1	Socket	TORX T 15	Square
Posidrive #2	Adapter 1/4"	TORX T 20	Recess 3
Slotted 0–1	Bit Holder	TORX T 25	
Slotted 3–4	1/4"	TORX T 30	

P/N	Description	1	2-9	10+
Emcal-36/4K	29-pc. set	\$240.00	\$211.20	\$181.65

## STURTEVANT RICHMONT Preset Torque-Limiting Screwdrivers

- Ideal for assembly of electronic components
- Clutch releases automatically without backlash when pre-set torque is achieved • Uses standard bits, sockets and adapters • Meets or exceeds requirements of MIL-W-26487C
- Drive: 1/4" female hex.



PM-5

P/N	Capacity	Length	1	2-9	10+
PM-5	20–100 in/oz	5-1/2"	\$109.00	\$87.20	\$76.75
PM-15	3–15 in/lb	6-1/4"	114.00	91.20	72.95
PM-36	7-36 in/lb	7-3/4"	147.00	117.60	103.50



Need Help?  
Just Call Us.

## ASG/JERGENS CL-Series Controlled-Torque Screwdrivers

- CL-Series screwdrivers offer  $\pm 1.5\%$  torque accuracy • Supplied with a 1/4" hex. collet, externally-replaceable brushes, and a 6' detachable cord
- Torque-adjusting nut can be locked to prevent movement of torque nut once the tool is calibrated



### CL-Series Mid-Range-Torque Screwdriver (1.2–14 lb/in)

P/N	Description	1-4	5+
64121	Model CL-6500	\$643.35	\$625.10

### CL-Series Light-Torque Screwdrivers

- P/Ns 64110 and 64111 are the most versatile light-torque tools in the CL-Series • Cover a torque range of .5–4.5 in/lb • Choice of a 1/4" hex. collet or 4-mm collet • With 4' detachable cord

P/N	Description	1-4	5+
64110	Model CL-4000, uses 1/4" hex. bit	\$520.30	\$500.00
64111	Model CL-4000, uses 4 mm bit	520.30	500.00

### CL-Series Tool Balancers and Positioners

- Keeps tools at whatever level or position the operator sets • Unit handles up to 2 lb

P/N	Description	1-4	5+
64309	Tool balancer	\$49.50	\$44.25
64313	Tool positioner	27.50	24.60

### CL-Series Transformer

- Operates any single CL Series tool • Switchable-power output of 20 or 30 V DC to allow 2 RPM ranges for tools • Input: 120 V AC, 2-A safety fuse (input), with built-in 4-A breaker (output) • Control max. 2.5 A

P/N	Description	1-4	5+
64163	Model CLT-50	\$230.20	\$205.65

NOTE: All CL-Series tools require a transformer.

continued



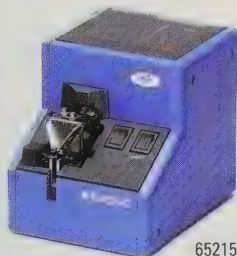
## ASG/JERGENS Tool Stand

- Vertical adjustment: min. (41"), max. (70")
- 360° rotation, lockable • Bin arm holds 3 AKRO-MILS bins (optional) • Stand pictured on page 134

P/N	Description	1-4	5+
65006	Tool stand only	\$190.50	\$170.00
65034	Bin arm	59.40	55.45

## ASG/JERGENS Precision Automatic Screw Feeder

- Makes small fasteners available for simple, fast pickup by user
- DC, 12-V to 16-V power supply included



P/N	Description	1-4	5+
65208	3.0 mm, #4 screws	\$710.30	\$627.00
65215	4.0 mm, #6, #8 screws	710.30	627.00

## ASG/JERGENS Portable Torque Testers

- Measures both static and dynamic torque
- Comes standard with analog output terminals
- Comes complete with carrying case, battery charger, driver adapter, and certificate of calibration traceable to the National Bureau of Standards
- Measurement range: 0-86 lb/in, 0-100 kg/cm
- Size 9" x 4-3/4" x 2-7/8" • Battery 1.2-V nicad cell x6 • Charging time: 15 h • Charge life: 20 h minimum under continuous use • Readout switchable from lb/in to kg/cm

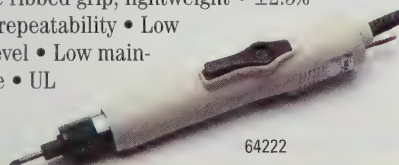


P/N	Description	1	2+
64013	Model H-100	\$2746.85	\$2565.00

## ASG/JERGENS Ergonomic Plug-In Torque Drivers

These drivers feature a new ergonomic design that is intended to create the lowest possible operator fatigue. An instantaneous braking system minimizes torque reaction and possible over-extension.

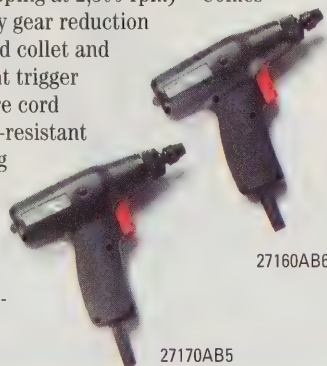
- No transformer needed • In-line design, comfortable ribbed grip, lightweight •  $\pm 2.5\%$  torque repeatability • Low noise level • Low maintenance • UL Listed



P/N	Description	Each
64222	VZ-1820, 3.5-16 in/lb, lever switch	\$793.30
64223	VZ-1820-PS, 3.5-16 in/lb, push-to-start	793.30
64224	VZ-3012, 8-26 in/lb, lever switch	793.30
64225	VZ-3012-PS, 8-26 in/lb, push-to-start	793.30

## WIRE-WRAP® Heavy-Duty Wire-Wrapping Tools

- Operator adjustable Indexing • Designed for production, installation, and service use
- Powerful motor for steady performance (120 V)
- Free speed is 4,500 rpm (some models offer a back-force mode for reduced speed cutting, stripping, and wrapping at 2,300 rpm) • Comes with: planetary gear reduction drive; insulated collet and collet nut; light trigger pull; and 2-wire cord
- High-impact-resistant plastic housing and 8' cord
- Accepts bits for wire sizes: 18-32 AWG • Double-insulated



P/N	Desc.	Speed	Wire Size AWG	Each
27160AB6	Standard	4500	18-32	\$337.00
27170AB5	Back-force	4500	24-32	346.60

## WIRE-WRAP XA4 Series Wrapping Tool

- Slimmer, lighter wrapping tool • For service work and medium production
- Uses 22-34 AWG wire
- 120 V, 3,500 rpm



P/N	Description	Each
27310AE1	XA4 Series wire-wrap tool	\$244.55

## WIRE-WRAP R3 Series Battery-Powered Wrapping/Unwrapping Tool



The R3 tool can be used at the bench or on the job site. The comfortable, slim, and light-weight design means far less strain and fatigue for the operator. The battery pack can be installed in 2 ways: for wrapping or unwrapping. The R3 can make over 1,100 connections on a single charge and can accept standard batteries in an emergency. It comes complete with a battery pack and charger, and is available with a standard or back-force nose assembly. Bits and sleeves are sold separately, see page 136.

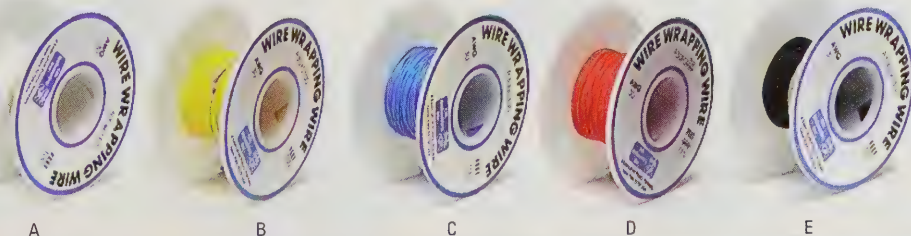
- Operator-adjustable indexing • Self-aligning gearing system • Compact charger unit recharges batteries in 1 hr • Engineered for reduced electrical interference



P/N	Description	Speed (RPM)	Wire Size (AWG)	Each
27600AE6	Standard	3,000	22-32	\$309.00
27610AE5	Back-force	3,000	24-32	376.55

## OK INDUSTRIES KYNAR™ Insulated Silver-Plated Copper-Conductor Wrapping Wire

- 30 AWG



Roll Size	P/N White (A)	P/N Yellow (B)	P/N Blue (C)	P/N Red (D)	P/N Black (E)	Each
100'	R30W-0100	R30Y-0100	R30B-0100	R30R-0100	R30BLK-0100	\$9.20
1,000'	R30W-1000	R30Y-1000	R30B-1000	R30R-1000	R30BLK-1000	38.50

NOTE: Also available in 24, 26, and 28 AWG/100' rolls.



## WIRE-WRAP Manual Wrapping Tools

These pencil-type WIRE-WRAP tools are used to produce perfect solderless wire-wrapped connections.

- Tool consists of handle, bit, and sleeve



P/N	Wire Gauge	Terminal Hole Diameter	Depth	Each
A2055730	18	.075"	1.00"	\$63.80
A2055735	20	.075"	1.00"	77.15
A2055731	22-24	.075"	1.00"	56.65
A2055768	26	.040"	.750"	68.40
A2055736	30	.036"	.750"	68.90

## WIRE-WRAP Manual Unwrapping Tools

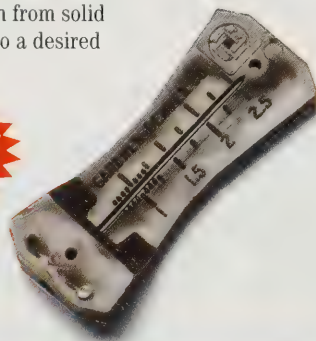
These tools remove solderless wrapped connections with ease.



P/N	Wire Gauge	Operation	Terminal Hole	Each
A31478	20-26	Left	.070"	\$11.75
505084	26-32	Left	.040"	13.85
505244	26-32	Left, right	.040"	24.50

## WIRE-WRAP Insulation Stripper

This tool easily removes thermo-plastic insulation from solid conductor wire to a desired strip length.



P/N	Wire Gauge	Max. Insulation Diameter	Each
525650	24	.0455"	\$14.20
525652	26	.0315"	14.25
525654	28	.0225"	14.25
525655	30	.0225"	14.25

## WIRE-WRAP Bits and Sleeves

- For air, electric, battery, and manual wire-wrap tools

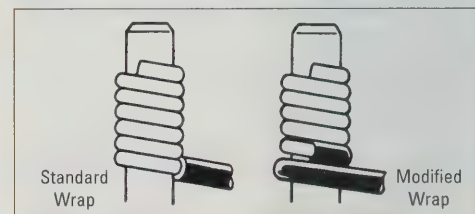


P/N Bit Model	Wire Gauge	Wrap Type	Wire Type	Each	P/N Sleeve Model	Max Insul. Diameter	Terminal Diag. Min.	Terminal Diag. Max.	Each
504222	18	S	A, O	\$39.05	18285	—	.061"	.074"	\$19.65
26495	20	M	A, O	32.30	26245	.059"	.042"	.074"	21.70
505413	22	S	A, O	32.30	18840	—	.049"	.074"	16.60
18632	22	S	A, O	32.30	18840	—	.061"	.086"	16.60
500131	22-24	S	A, O	34.80	18840	—	.054"	.074"	16.60
502134	24	S	A, O	45.75	502129	—	.024"	.044"	24.05
505415	24	M	O	44.30	502129	.044"	.024"	.044"	24.05
506991	24	M	A	51.05	506999	.041"	.047"	.067"	31.30
512058	24	S	A, O	18.20	512056	—	.055"	.074"	18.20
519070	24-26	M	A, O	43.40	18840	.046"	.054"	.074"	16.60
505279	26	S	A, O	46.00	507100	—	.023"	.039"	28.00
506445	26	M	A, O	43.40	507100	.031"	.023"	.039"	28.00
511250	26	M	O	71.40	501098	.043"	.031"	.038"	27.00
502118	26	M	A, O	35.35	512056	.041"	.053"	.069"	18.20
509278	28	M	O	43.40	507100	.030"	.031"	.036"	28.00
501097	30	M	A, O	53.45	507100	.027"	.026"	.031"	28.00
507063	30	M	O	43.40	507100	.023"	.031"	.036"	28.00
519936	30	M	A	43.40	507100	.028"	.031"	.038"	28.00
507573	30	M	A	43.40	507100	.023"	.033"	.036"	28.00
501381	30	M	A	43.40	512056	.027"	.060"	.065"	18.20
501194	30	M	A	45.75	502129	.027"	.066"	.069"	24.05

NOTE: Wire types: A = alloy; O = oxygen-free copper wire.

## Types of Wrap

A standard bit wraps only the bare wire around the terminal. A modified bit wraps a portion of insulation around the terminal in addition to the bare wire. This greatly increases the ability of the connection to withstand vibration.



## OK INDUSTRIES Wrap/Strip/Unwrap Tools

## OK INDUSTRIES Hand-Wrapping/Unwrapping Tools

- One tool does 2 jobs • Switch from wire-wrapping to unwrapping in seconds by changing cap from one end to the other



HW-UW-224

P/N	Wire Gauge	Wire Dia.	Depth
HW-UW-18-19	18-19 AWG	.075"	1"
HW-UW-20	20 AWG	.075"	1"
HW-UW-224	22-24 AWG	.075"	.807"
HW-UW-26SM	26 AWG	.046"	.750"
HW-UW-30	30 AWG	.036"	.750"

P/N	Wire	Terminal	OD	Each
WSU-2224	22-24	.075"	.213"	\$34.00
WSU-26M	26	.075"	.213"	37.00
WSU-30M	30	.036"	.125"	22.00

NOTE: All have terminal hole depth of 1.5".

P/N	Unwrap Dia.	Term. Depth	Each
HW-UW-18-19	.075"	.750"	\$84.50
HW-UW-20	.075"	.750"	72.25
HW-UW-224	.075"	.750"	72.25
HW-UW-26SM	.038"	.625"	84.50
HW-UW-30	.038"	.625"	84.50



## IDEAL INDUSTRIES Benchtop Wire Processor

- RS-232 and wire-marker interface • Comes with wire straightener (P/N 45-751) • Fully electric, programmable wire processor • Measures, cuts, strips, and counts wire with ease • Complete set-up change in less than one minute • Stores up to 99 programs • 6-sigma process capability of 1% wire length or better • Performs full-strip or semi-strip operation on one or both ends



45-754

P/N	Description	Each
45-754	Benchtop wire-processor	\$8195.00

Products with this symbol ship directly from the manufacturer.

## IDEAL INDUSTRIES WIRE PREPPER® SYSTEM II and WIRE PREPPER LITE

- Wire processor automatically measures, cuts and counts wire • Both machines handle 10–30 AWG wire and multi-conductor cable • 45-700 cuts up to 3/4" tubing • 45-700 has capacity to store up to 99 set-ups



45-725

45-700

P/N	Description	Each
45-700	WIRE PREPPER SYSTEM II	\$4820.00
45-725	WIRE PREPPER LITE	2641.00

Products with this symbol ship directly from the manufacturer.

## IDEAL INDUSTRIES POWER STRIPMASTER® Wire Stripper

- Pneumatic wire stripper—effortlessly strips 8–30 AWG • Uses same blades as IDEAL STRIPMASTER • Purchased as a complete kit with foot pedal, hook-up kit and air blast



45-146

P/N	Description	Each
45-146	POWER STRIPMASTER (complete kit)	\$800.70

## IDEAL STRIPMASTER® Model 940 Wire Stripper

The Model 45-940 automatically strips a wide variety of insulations from 30 AWG to 8 AWG to commercial and military wire-stripping specifications.

- Standard V-blades for quick and easy adjustment to a wide range of wires • Fixed die and knife blades available to meet precise military stripping requirements • Accurate, adjustable strip-length control allows strips from .050" (1 mm) to 1" (25 mm)—can also be set for partial strips • Virtually eliminates repetitive-motion disorders associated with high-production hand stripping

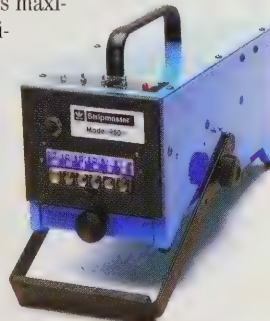


45-940

P/N	Description	Each
45-940	STRIPMASTER wire stripper	\$2782.50

## IDEAL INDUSTRIES STRIPMASTER®

- Strips 6 different wire diameters, insulations, and strip lengths without switching tools or reinstalling blades • Meets military and aerospace requirements • Offers maximum speed and flexibility • Designed to strip wire in the 10–30 AWG range • Typical productivity rates for the IDEAL 45-950 are shown in the following chart:



45-950

Strip Length	Pcs./Hr.
Short (1/8")	2,500–3,000
Medium (1/4")	2,000–2,500
Long (1/2")	1,500–1,700

P/N	Description	Each
45-950	STRIPMASTER Model 950	\$5659.00

Products with this symbol ship directly from the manufacturer.

## IDEAL INDUSTRIES Single- and Dual-Blade Rotary Stripper

- Precision nick-free stripping • Single-blade or dual-blade units available • Rotary stripping head twists wire to facilitate tinning and termination processes

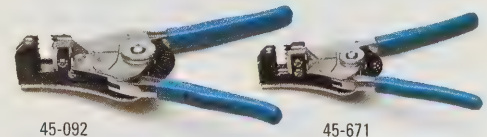


45-211

P/N	Description	Each
45-211	Single-blade rotary stripper	\$823.45
45-213	Dual-blade rotary stripper	876.20
L-7706	45° carbide-blade assembly for 45-211	57.05

## IDEAL INDUSTRIES STRIPMASTER and STRIPMASTER LITE

- Knife-type blade and wire gripper hold wire centered with stripping hole • Stripping and slug removal in one step • Knife-type stripping blades have form-ground holes that penetrate the insulation like a knife for a clean cut • Flat blades available for stripping two or more wires at once (call for information and pricing)



45-092

45-671

P/N	Description	Each	P/N	Description	Each
<b>STRIPMASTER</b>			45-098	20–30 AWG	\$27.60
45-090	8–12 AWG	\$27.60	<b>STRIPMASTER LITE</b>		
45-092	10–22 AWG	27.60	45-671	16–22 AWG	34.55
45-093	14–22 AWG	27.60	45-672	24–30 AWG	34.55
45-097	16–26 AWG	27.60			

## IDEAL INDUSTRIES CUSTOM STRIPMASTER and CUSTOM STRIPMASTER LITE Wire Strippers

- Unique die-type blade covers a wide range of precision, commercial, and military applications • Required for TEFLON wire-stripping



45-177

45-639

P/N	Description	Each
<b>CUSTOM STRIPMASTER</b>		
45-176	10–14 AWG TEFLON E (600 V)	\$125.25
45-177	16–26 AWG TEFLON E (600 V)	125.25
45-174	16–26 AWG TEFLON EE (1,000 V)	125.25
45-175	26–30 AWG TEFLON EE (1,000 V)	125.25
45-170	10–12 AWG PVC insulations	125.25
45-171	16–26 AWG PVC insulations	125.25

P/N	Description	Each
<b>CUSTOM STRIPMASTER LITE</b>		
45-639	20–26 AWG TEFLON E	\$125.25
45-640	24–30 AWG TEFLON E	125.25
45-635	16–22 AWG TEFLON EE	125.25
45-636	20–26 AWG TEFLON EE	125.25
45-632	16–22 AWG PVC and hard-to-strip insulation	125.25
45-638	16–22 AWG TEFLON E	125.25
45-637	24–30 AWG TEFLON EE	125.25

**FAX**

We accept fax orders 24 hours a day, 7 days a week.



We provide telephone technical assistance with your purchases.



## IDEAL INDUSTRIES PREMIUM T®-Strippers and T®-Strippers

- Precision form-ground, knife-type blades
- Strips wire easily without operator fatigue
- Models strip 10–30 AWG solid and 8–26 AWG stranded wire
- Built-in wire cutter and looping holes
- Easy-to-identify painted gauge markings
- Versatile plier-type nose (premium only)

### Premium T-Strippers



P/N	Wire Range	1-9	10+
45-215	10–18 AWG solid	\$14.30	\$13.35
45-216	16–26 AWG stranded	14.50	13.60
45-217	22–30 AWG solid	14.50	13.60
45-218	8–10 AWG stranded	14.50	13.60
45-247	12 or 14 AWG solid	16.20	15.05

### T-Strippers



P/N	Wire Range	1-9	10-24	25+
45-120	10–18 AWG solid wire	\$9.00	\$8.30	\$7.65
45-121	16–26 AWG stranded wire	10.35	9.50	8.90
45-125	22–30 AWG solid wire	10.35	9.50	8.90
45-124	8–16 AWG stranded wire	10.50	9.65	9.15
45-123	T-cutter, cut up to 1/2" OD	10.50	9.65	9.15

NOTE: More models are available.

## IDEAL INDUSTRIES 7-in-1 Stripper and Combo Tool

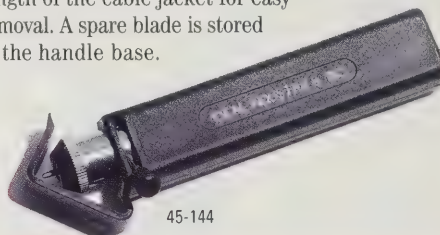
- Spring-loaded handles for quick and easy use, and cushioned grips for comfort
- Locking pawl to keep jaw closed when not in use
- Cuts stranded, solid, ROMEX and UF wire up to 6 AWG
- Cuts unhardened bolts and screws, and screws of commonly encountered sizes such as 4–40, 6–32, 8–32, 10–24, and 10–32
- Crimps bare and insulated terminals for 10–22 AWG wire sizes
- Strips 6–16 AWG solid and 8–18 AWG stranded wire
- Loops wire from either the front or back of the tool



P/N	Description	1-9	10+
45-777	7-in-1 stripper	\$24.70	\$23.70

## IDEAL Round-Cable Slitting and Ringing Tool

This tool can be used on single- or multiple-conductor cables up to 1.75" OD. The blade can be adjusted for jacket thicknesses up to .125" and it can cut around a cable jacket as well as slit the length of the cable jacket for easy removal. A spare blade is stored in the handle base.



P/N	Description	1-9	10+
45-144	Round-cable slitting and ringing tool	\$42.10	\$36.10
45-128	Cable stripper for 1/4" to 3/4" OD	22.45	21.15
LB-1748	Replacement blades for 45-144, 2/pkg.	12.90	11.10
L-7486	Replacement blades for 45-128, 2/pkg.	7.55	7.00

## IDEAL CRIMPMASTER™

- Full-cycle ratchet assures precise repeatable crimp connections
- Durable, reliable high-carbon steel (44-46 ROCKWELL C hardness) frame with interchangeable dies



Tool	Description	Each	Die Only	Each
30-500	10–22 AWG insulated terminals	\$53.55	30-579	\$21.60
30-501	8–22 AWG noninsulated terminals	53.55	30-580	21.60
30-502	RG-58, RG-59/62 AU, BNC/TNC 3-piece hex-type connectors	53.55	30-581	21.60
30-480	10–22 AWG open-barrel connectors	53.55	30-586	21.60
30-477	10–22 AWG insulated terminals with thinner-wire barrels	53.55	30-594	21.60
30-506*	Frame without die			37.05
30-507**	Telephone crimper frame without die			37.05

\*Can be used with all dies except 30-583 and 30-584.

\*\*For use with dies 30-583 and 30-584 only.

Crimpers also available for coaxial and modular plugs.



We provide telephone technical assistance with your purchases.

## IDEAL MAXIM Wire Stripper

The new MAXIM wire stripper self-adjusts to different wire sizes and insulation densities. Its laminated stripping-blade system uses 34 blades within each stripping jaw to conform to the cross-section profile of the wire being stripped. Efficient design allows for minimal hand pressure for both cutting and stripping, reducing the possibility of repetitive-motion-injury.

- Blades self-adjust to strip wires 10 AWG–26 AWG (solid or stranded)
- Built-in wire cutter cuts many types of cable and wire precisely and smoothly
- Carbon-steel blades are hardened, tempered, and polished for durability and consistency
- Stripping blades can be replaced easily for continuous field use



P/N	Description	Each
45-327	MAXIM wire stripper	\$70.15
LA-2524	Replacement blade-set cartridge	29.20

## IDEAL PROAX Coaxial Strippers

- Adjustable slide cable guide allows stripping of: RG-58, RG-59/RG-62, and RG-6 coaxial cable
- Replacement-blade cassettes
- A variety of 2-step and 3-step cassettes available



P/N	Description	Each
45-520	3-step stripper for .240" braid and .240" dielectric (thicknet)	\$24.95
45-522	Replacement blade for 45-520	8.95
45-521	3-step stripper for MIL-C-39012 .328" connector strips and .109" dielectric	24.95
45-523	Replacement blade for 45-521	8.95
45-526	2-step stripper for .250" braid shield	24.95
45-524	Replacement blade for 45-526	8.95
45-527	2-step stripper for .480" braid shield	24.95
45-525	Replacement blade for 45-527	8.95
45-528	3-step stripper for .240" braid and dielectric (thicknet)	24.95
45-522	Replacement blade for 45-528	8.95



We provide reduced pricing on large-quantity orders.



## IDEAL COAX STRIPMASTER® Wire Strippers

There are COAX STRIPMASTER wire strippers to meet all your coaxial stripping needs.

- Grip and strip • Spring action • Knife-type blades • Replacement blades available



45-262

P/N	Description	Each
45-262	Stripper for RG-6	\$26.60
45-264	Stripper for RG-58	26.60
45-265	Stripper for RG-59	26.60
45-266	Stripper for RG-62	26.60

## IDEAL Coaxial-Cable Strippers

- Simple, easy-to-use precision tool • 3 blades: 1 located on each side of unit, and 1 located on the front for slitting • Adjustable blades can be set for any depth • For coaxial or multi-conductor cables

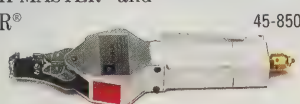


45-163

P/N	Description	Each
45-162	0"-1/8" coaxial-cable stripper, gray	\$18.40
L-9225	Replacement blade for 45-162	4.40
45-163	1/8"-7/32" coaxial-cable stripper, blue	18.05
L-9225	Replacement blade for 45-163	4.60
45-164	1/4"-9/16" coaxial-cable stripper, blue	30.70
L-9226	Replacement blade for 45-164	6.10
45-165	3/16"-5/16" coaxial-cable stripper, black	18.40
L-9225	Replacement blade for 45-165	4.40

## IDEAL INDUSTRIES POW-R-LITE™ STRIPMASTER and POW-R-MASTER®

- Pneumatic one-touch, lever-actuated triggers
- Reduces repetitive motions and fatigue associated with CTS • Lightweight and ergonomically designed • POW-R-LITE™ uses same blades as the CUSTOM LITE and STRIPMASTER® LITE
- POW-R-MASTER® uses same blade as CUSTOM STRIPMASTER® and STRIPMASTER®



45-850



45-2521

P/N	Description	Each
45-850	POW-R-LITE	\$770.25
45-2521	POW-R-MASTER	1096.95
45-807	Coil-air line	34.60

## IDEAL CRIMPMASTER® Crimp Tools

These tools are for plant maintenance, field service, LAN installations, small production runs, and for use in prototype shops. A selection of dies allows these versatile tools to be used on a variety of coaxial-cable sizes.

- High-grade steel • Full cycle • Compound leverage • Triple-ratcheted • Ergonomic handles
- Built-in safety release



30-486

P/N	Description	Each
30-502	For RG-58, RG-59/62AU, BNC/TNC 3-piece hex-connectors	\$53.55
30-581	Replacement die set for 30-502	21.60
30-503	For CATV RG-59 and RG-6 captive-ring "F" connectors	53.55
30-582	Replacement die set for 30-503	21.60
30-488	For AMP DEC RG-58 thinwire connectors	53.55
30-588	Replacement die set for 30-488	21.60
30-486	For RG-58 and RG-59 PLENUM cables	53.55
30-591	Replacement die set for 30-486	21.60

## IDEAL DATA T®-CUTTER

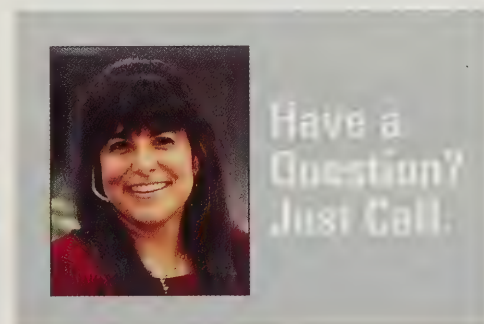
This new cutter is designed to cut round communications cable and still maintain cable geometry for better cable performance. It can cut multipair cable up to .500" and coaxial cable up to RG-9/U. The blade's cutting capabilities are suitable for soft cable, not ACSR—steel-reinforced center conductors can be trimmed with bolt cutting holes. A comfort-grip design increases handling ease and a locking latch keeps the tool closed in the pouch.



45-074

P/N	Description	Each
45-074	DATA T-CUTTER	\$14.95

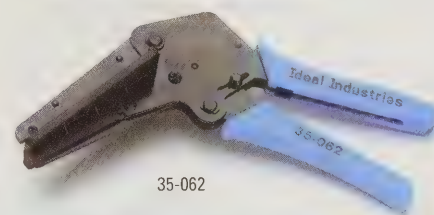
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## IDEAL Flat-Ribbon Cable Cutter

This tool cuts up to 64 conductors. The cable is cut at an exact 90° angle without deforming the conductors.

- Safety lock • Comfort-grip handles



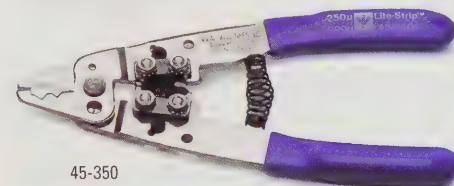
35-062

P/N	Description	Each
35-062	Flat-ribbon cable cutter	\$110.10
K-7390	Replacement blade	13.70
K-7389	Replacement anvil	19.35

## IDEAL LITE-STRIP™ Optical-Fiber Stripper

This tool precisely strips outer cable-jacket insulation, tight buffer-tube insulation, and mechanically strippable coatings.

- Built-in guides for proper stripping hole
- Comfort grips



45-350

P/N	Description	Each
45-350	LITE-STRIP 900µ/250µ	\$99.95
LB-070	Transparent wire stop	7.25
LB-661	Set of replacement blades	81.70

## IDEAL CYCLOPS® Data-Cable Stripper

This stripper provides fast-and-easy removal of outer-sheath insulation (PVC and plenum types) from all unshielded twisted-pair (UTP), shielded twisted-pair (STP), and multi-conductor cables up to 11 mm in diameter. It cuts the jacket without damaging the inner insulation.



45-514

P/N	Description	Each
45-514	CYCLOPS data-cablestripper	\$39.60



We accept fax orders 24 hours a day, 7 days a week.



We provide telephone technical assistance with your purchases.



## TELEDYNE ELECTRONIC TECHNOLOGIES

### Thermal Wire Stripper

- Single-button control and fast-heating blades—squeeze the handle, press the button, and strip
- Blades heat from ambient temperature to selected temperature, up to 1,700 °F (927 °C), in 2 s, and cool instantly
- Blade temperature controller allows adjustment to accommodate high- and low-melt insulations on 5-ga to 38-ga wire
- Works well on TEFLON, KAPTON, KYNAR, nylon, vinyl, and neoprene
- ESD model now available



P/N	Description	Each
TWC-1	Thermal-insulation stripper with temperature control	\$279.50
TWC-1ESD	Same as TWC-1, only ESD safe	\$68.15
TW-1	Standard model, self-contained, without temperature control	\$279.50
TC-1	Temperature-control unit	\$85.15

- Same as TWC-1 with the added convenience of longer electrodes
- Strips up to 3.5" of insulation
- Ideal for computer wells and instrument enclosures
- Also available in 22 V
- Includes strip-stop and gauge-stop
- ESD model now available

P/N	Description	Each
TWC-2	Thermal-insulation stripper, long-nose with temperature control	\$308.75
TWC-2ESD	Same as TWC-2, only ESD-safe	\$397.35
TW-2	Standard model, self-contained without temperature control	\$235.05

### TELEDYNE TW, TWC Accessories and Replacement Parts

P/N	Description	Each
001-101-1	Handle assembly (short-nose for TW-1 and TWC-1)	\$53.15
001-104-1	Nose-block assembly (short-nose for TW-1 and TWC-1)	\$37.20
001-312-1	Blank blade, includes screws for TW-1 & 2, TWC-1 & 2	\$6.00
001-312-2	Notched blade, includes screws for TW-1 & 2, TWC-1 & 2	\$6.00

## CLAUSS NO-NIK® Wire Strippers

- Individual strippers available for each wire gauge, both stranded and solid, to ensure high reliability
- Strippers manufactured to within .0005" variance



P/N	Cutting Blade Dia.	Handle Color	1-5	6+
NN010	.010"	Light blue	\$38.55	\$34.20
NN012	.012"	White	\$8.55	\$4.20
NN014	.014"	Dark green	\$8.55	\$4.20

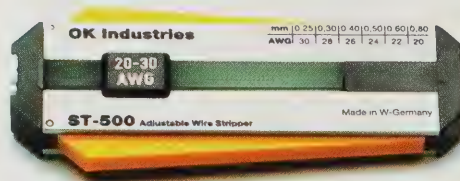
## CLAUSS NO-NIK Fiber-Optic Wire Stripper

- Strips insulation without nicks, cuts, or scrapes to the conductor
- Manufactured to within .0002" accuracy
- No adjustments necessary

P/N	Handle Color	µm (microns)	1-5	6+
NN203	Red	203	\$39.15	\$36.10

## OK INDUSTRIES Adjustable Precision Wire Strippers

- Adjustment dial for six different settings
- Calibrated strip lengths up to 2"
- Squeezes and pulls in 1 motion
- 4 hardened-steel blades cleanly cut wire insulation
- Shirt-pocket size and lightweight, less than 1 oz
- ABS housing enclosure



ST-500

P/N	Description	1-5	6+
ST-500	Cuts 20-30 AWG	\$49.95	\$48.00
ST-550	Cuts 18-28 AWG	\$49.95	\$48.00

## AMP SUPER CHAMP® Service Crimping Tool

- Includes wire cutter and stripper, bolt cutter, and stud gauge
- Color-coded wire-barrel crimping dies
- Separate insulation-barrel crimping die
- Cushioned handles



314963-1

P/N	Description	1-5	6+
314963-1	Insulated terminals and splices 10-22 AWG	\$10.20	\$8.30

## AMP SUPER CHAMP® All-Purpose Service Crimping Tools

- Crimps both open-barrel terminals and closed-barrel insulated and noninsulated terminals and splices
- Includes bolt cutter
- Special crimping notch for TAB-LOK FASTON® terminals available

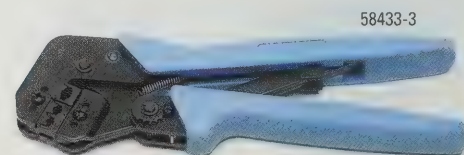


90330-1

P/N	Description	1-5	6+
90287-1	All-purpose I, 10-22 AWG	\$24.50	\$15.95
90330-1	All-purpose II with TAB-LOK crimp, 10-22 AWG	\$24.50	\$15.95

## AMP PRO-CRIMPER Hand Tool

- Inexpensive, very durable
- Ratchet control provides complete crimping cycle, helps eliminate partial crimps
- Emergency ratchet release
- Angled head provides a comfortable hand and wrist position
- 1 tool with interchangeable dies crimps several different types of connectors
- Multiple terminal sizes accommodated in 1 die
- Precision construction, high-carbon steel
- Extra-strength pivot pins

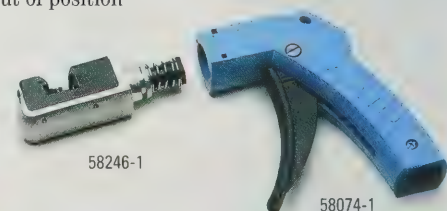


58433-3

P/N	Description	1-5	6+
58433-3	Insulated terminals	\$68.00	\$58.00
58433-2	Coax RG 58/59, hex. crimp, 50 Ω	68.00	58.00
P/N	Description	Each	
58448-2	Subminiature D, 20DF pins and sockets	\$114.00	
58495-1	Type III+, Type VI pins and sockets	114.00	

## AMP Pistol-Grip Tool for IDC Connectors and Modular Heads

- Individually inserts wires into contacts
- Automatically advances the connector after each termination
- Anti-backup pawl prevents the connector from moving out of position



58246-1

58074-1

P/N	Description	Each
58246-1	MTA-100 modular head	\$101.00
58247-1	MTA-156 modular head	\$101.00
58062-1	MPMODU MT modular head	\$152.50
58063-2	AMPLIMITE HDE-20 modular head	\$171.50
58074-1	Pistol-grip handle (not included with above products)	\$48.50



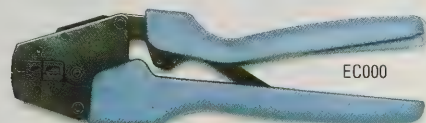
Products with this symbol are some of our most popular and best priced.



## XCELITE ERGO CRIMP® and ERGO CRIMP PLUS®

COOPER TOOL's most advanced crimping tools deliver up to 50% better mechanical gain than any other kind.

- Lower handle force for fewer work-related repetitive-motion injuries (e.g., carpal tunnel syndrome) and increased production
- Purchase complete tools, frames and dies separately



EC000

### Crimping Tools (Frame Only)

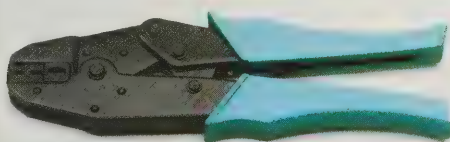
P/N	Description	1-11	12+
EC000	8.66" ERGO CRIMP (25% better mechanical gain)	\$62.90	\$56.00
ECP000	10" ERGO CRIMP PLUS (40-50% better mechanical gain)	75.50	67.20

### Complete Crimp Tools (Frame and Die Set)

P/N	Description	1-11	12+
ECP100	ECP000 frame, D-100 die set for 10-22 AWG insulated terminals	\$144.70	\$128.50
EC102	EC000 frame, D-102 die set for RG58, RG59/62AU BNC/TNC coax connectors	132.10	117.25
EC108	EC000 frame, D-108 die set for 20-30 AWG open-barrel & D-sub contacts	144.15	128.00

## XCELITE Mechanical Maxi-Crimper

- Built-in ratchet ensures a full-cycle complete crimp • 8.86" length with straight jaws • For red, blue and yellow insulated terminals size: 10-22 AWG



MAC-2210

P/N	Description	1-11	12+
MAC-2210	Mechanical maxi-crimper	\$105.05	\$88.75

NOTE: Other models are available.

**\$** We provide reduced pricing on large-quantity orders.

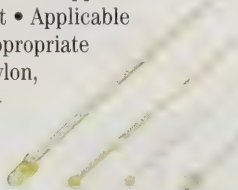
**SAVE** Products with this symbol are some of our most popular and best priced.

**FAX** We accept fax orders 24 hours a day, 7 days a week.

**☎** We provide telephone technical assistance with your purchases.

## PANDUIT® Cable Ties

- Engineered to increase productivity and reduce total installed cost
- Low threading force, finger-grip tip, no sharp edges, and bent tip
- Consistent quality assured through tests conducted by military and independent labs
- One-piece construction
- Up to 250-lb minimum loop tensile strength
- Materials to suit the application and environment
- Applicable sizes meet all appropriate MIL SPECS
- Nylon, locking, general-purpose
- UL Recognized



## PANDUIT Hand-Operated Cable-Tie Installation Tool

- Controlled-tension cut-off tool
- Squeeze trigger to automatically apply tension and cut excess flush
- Industry-preferred tool design
- Lightweight and balanced
- Requires no special maintenance
- Rugged all-steel construction
- Easy to operate and adjust for different tie cross-sections
- Use with miniature, intermediate and standard cable ties



GS2B

P/N	Description	Each
GS2B	Cable-Tie Installation Tool	\$122.20

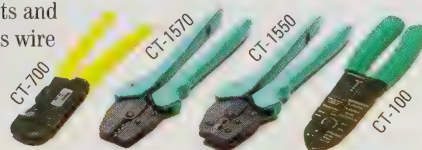
  

P/N	Max. Bundle	Approx. Length	Loop Min. Tensile Strength	Qty./pkg.	Each/pkg.
PLT1M-M	.870"	3.9"	18	1,000	\$23.55
PLT1.5M-M	1.25"	5.6"	18	1,000	33.70
PLT2M-M	2"	0"	18	1,000	35.00
PLT1.5I-M	1.38"	5.6"	18	1,000	36.60
PLT2I-M	2"	8"	18	1,000	45.65
PLT2.5I-M	2.5"	9.7"	40	1,000	94.50
PLT3I-M	3"	11.4"	40	1,000	98.10
PLT4I-M	4"	14.6"	40	1,000	145.45
PLT2S-M	1.88"	7.4"	50	1,000	49.05
PLT3S-M	3"	11.5"	50	1,000	127.50
PLT4S-M	4"	14.5"	50	1,000	143.80

NOTE: More sizes are available.

## PANDUIT PAN-TERM® Installer-Controlled, Hand-Operated, Crimp Tool

- Crimps #10-#26 insulated and noninsulated terminals
- Cuts #4, #6, #8, and #10 screw sizes
- Cuts and strips wire



P/N	Description	Each
CT-100	Pliers-type crimp	\$31.20

## PANDUIT Ergonomic Contour Crimp Terminal Crimp Tool

- Reduces handle effort up to 50%
- For #22-10 AWG insulated terminals products

P/N	Description	Each
CT-1550	Controlled cycle crimp tool for #22-10 AWG insulated terminals	\$209.40
CT-1570	Controlled cycle crimp tool for #22-10 AWG uninsulated terminals	209.40

## PANDUIT PAN-TERM® Compression-Connector Crimp Tool

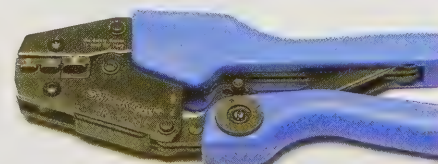
- Provides connections for LCA, SCS, LAA, and SA lugs and splices
- Also #2-#8 noninsulated terminals

P/N	Description	Each
CT-700	Hand-held, controlled cycle	\$335.30

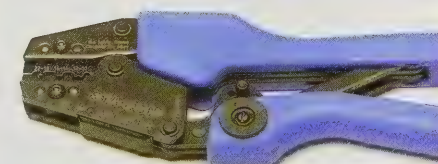
## THOMAS & BETTS COMFORT CRIMP™ Terminal Tools

These ergonomically-designed tools help reduce the risk of carpal tunnel syndrome, the cause of almost 1 out of 2 industrial injuries. These unique tools deliver the same reliable crimp you're used to, and require up to 60% less force on the handle than do other terminal head tools.

- ERG-2001 installs nylon and vinyl insulated terminals, disconnects, and splices 22-10/22-14 AWG
- ERG-2002 installs noninsulated terminals, disconnects, and splices 22-10 AWG



ERG-2001



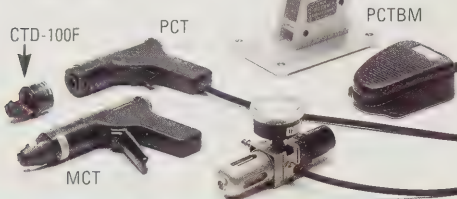
ERG-2002

P/N	Description	Each
ERG-2001	RA, RB, RC insulated-terminal tool	\$163.40
ERG-2002	A, B, C, noninsulated-terminal tool	148.55



## PANDUIT MCT Manual Tool

- Lightweight, fast, easy to use
- Automatically indexes to next circuit position
- Used with CTD interchangeable nose section



P/N	Description	Each
MCT	Manual tool	\$117.00

## PANDUIT PCT Pneumatic Tool

- Same features as MCT
- Uses 85-PSI minimum air pressure
- Includes filter regulator and 10-ft hose assembly
- Used with CTD interchangeable nose section

P/N	Description	Each
PCT	Pneumatic tool	\$624.00

## PANDUIT PCTBM Bench Mount

- Converts PCT hand tool into a single-wire-insertion bench press
- Includes foot pedal, air valve, hose assembly, and hose fittings

P/N	Description	Each
PCTBM	Bench mount for PCT hand tool	\$546.00

## PANDUIT CTD Interchangeable Nose Section

- Terminates discrete wires into end connectors

P/N	Description	Each
CTD-100F	For .100" center-line Type CE, CEP, CEH end connectors	\$143.00
CTD-156F	For .156" center-line Type CE, CEP, CEH end connectors	143.00

## IDEAL Cable-Tie Tools

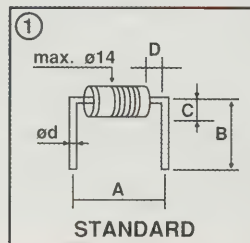
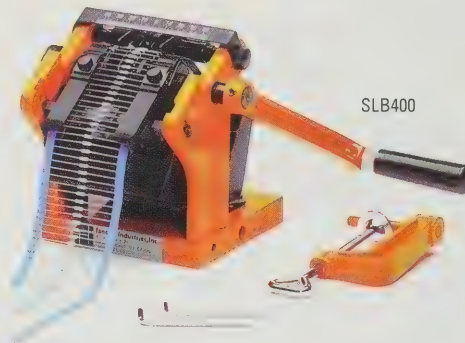
- Three models for use on all types of miniature, intermediate, standard, and heavy-duty cable ties
- Give consistent positive tension
- Adjust to desired tension



P/N	Description	Each
15-991	Cable-tie tool for miniature, economy, intermediate and standard cable ties	\$63.50
41-990	Cable-tie tool, medium duty, for miniature, intermediate and standard cable ties	133.20
41-995	Cable-tie tool (large) for standard and heavy-duty cable ties	168.90

## FANCORT Axial-Lead Former

- Produces thousands of precisely formed components just by turning the crank
- Delivers up to 25,000 taped or 1,200 loose components per hr with the feeder (feeder: P/N SLB403 not included)
- Protects components from mechanical stress and prevents axial tension on delicate diodes
- Model SLB400S allows you to achieve a minimum of .19" lead spacing
- Size: 5.71" (W) x 6.3" (H) x 6.89" (D)
- Weight: 4.4 lb



P/N	Adjustable A	Max. B	Min. C	Min. D
SLB400	.236"–1.575"	.59"	.142"	.047"
SLB400S	.197"–1.575"	.59"	.142"	.027"

P/N	Description	Max. OD	Each
SLB400	Axial-lead former	.031"	\$1100.00
SLB400S	Axial-lead former	.020"	1200.00

## FANCORT Parts Feeder

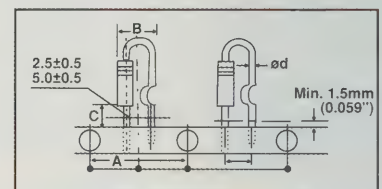
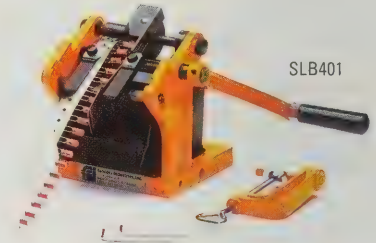
- Attaches easily to the axial lead former: SLB400(S)
- Feeds loose components of 3 sizes
- Size: 6.5" (W) x 2.56" (H) x 5.51" (D)
- Weight: .89 lb



P/N	Description	Each
SLB403	Parts feeder for SLB400 and SLB400S	\$740.00

## FANCORT Taped-Component Cutter

- Cuts components from single bandoliers with a fully adjustable leg length of .060" to .490"
- Delivers up to 12,000 pieces per hr
- SLB401S is available for a wider hole span bandolier for larger components
- Size: 5.71" (W) x 6.3" (H) x 6.89" (D)
- Weight: 4.2 lb



P/N	A	B	C	Max. OD
SLB401	.5	.510	.060–.490	.490
SLB401S	.590	.630	.060–.490	.040

P/N	Description	Each
SLB401	Taped-component cutter	\$1050.00
SLB401S	Taped-component cutter	1200.00

## FANCORT PCB Separator

An alternative to hand cutting and high-cost routing and cutting machines, this low-cost table-top PC-board separator uses a single knife to cut the nibs off panels without leaving burrs or damaging the boards or nearby components.

- Cuts nibs up to 5 mm in length—max. board thickness: 2.35 mm
- Knives are easy to replace—less than 5 min
- Cuts round boards within a min. radius of 3.5 mm
- Pneumatically operated with foot-switch control
- Hardened tool-steel knives last for thousands of cuts—depending on usage



NTR-1

P/N	Description	Each
NTR-1	PCB separator	✚ \$1500.00
NTR-1K-xx	Knife for NTR-1 (specify width)	✚ 175.00

NOTE: When specifying knife width, allow .005" clearance between knife and routed slot.

✚ Products with this symbol ship directly from the manufacturer.



Products with this symbol only ship via surface, due to weight or size.



## APS Component Counter

This is a rugged, reliable, and easy-to-use counter for any type of taped device—axial, radial, or SMD.

- 100%-guaranteed accuracy and reliability
- Auto forward/reverse makes counting foolproof
- "Divide-by" feature permits an exact count of virtually any type and size of component
- Count can be preset
- Easy-to-read 6-digit LCD
- State-of-the-art photoelectric sensor
- Unique push-button tape marker for axial and radial components.



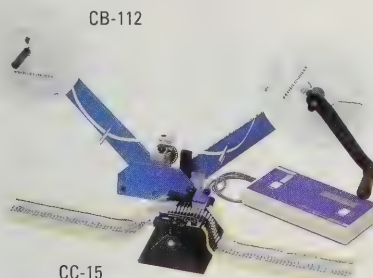
GC-30

Specifications	
Input	115 V AC, 60 Hz, 1 A
Max. Reel Diameter	16"
Max. Leaded-Component Tape Width	4.33"
SMD Tape Width	0.315"–2.36"
Max. Body Diameter	1.1"
Lead Diameter	0.014"–.110"

P/N	Description	Each
GC-30	Component counter with reel stand	\$2395.00
GC-20	Component counter only	1995.00
GC-RS	Reel stand for GC-20	600.00

## GRIP TECHNOLOGIES Component-Counting System

- For counting radial and axial-lead SMDs
- Counter has 8 settings to compensate for different size SMD devices and varying numbers of leads on through-hole devices
- Through-hole taped components can be pulled through by hand



CB-112

CC-15

P/N	Description	Each
CC-15	Universal component counter	\$1425.00

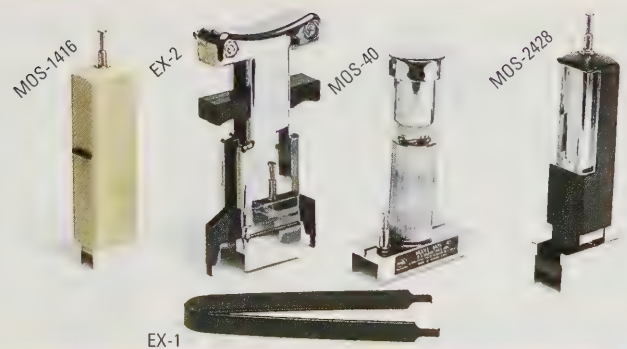
NOTE: Re-reelers are available for SMD and through-hole components. They are optional for through-hole components.

P/N	Description	Each
CB-112	Re-reeler for surface-mount components (required)	\$695.00
CB-111	Optional re-reeler, speeds up counting operations of through-hole components	695.00

## OK INDUSTRIES DIP I.C. Insertion and Extraction Kit

- Contains inserters and extractors for dips, 14–40 pins
- Tools have conductive surfaces and are CMOS safe
- Grounding lugs included where needed

The WK-7 Kit includes the 5 pictured products.

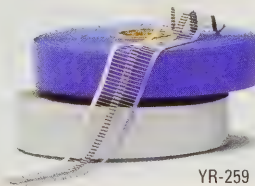


P/N	Description	1-9	10+
EX-1	14-16 pin extractor	\$2.95	\$2.85
EX-2	24-40 pin extractor	21.90	20.95
MOS-1416	14-16 pin inserter	19.00	18.20
MOS-2428	24-28 pin inserter	19.00	18.20
MOS-40	36-40 pin inserter	21.50	21.00
WK-7	Dip I.C. insertion/extraction kit	69.95	67.00

## 3M SCOTCH BRAND YR-259 Axial-Reeling Tape

The YR-259 is a high-performance tape for bandoliering and sequencing of axial-lead components.

- High-tensile-strength backing
- Specially designed adhesive locks in components
- Special release coating allows smooth unwinding
- Superior feeding characteristics during board insertion
- Color: white or blue
- Roll length: 3,500 yd

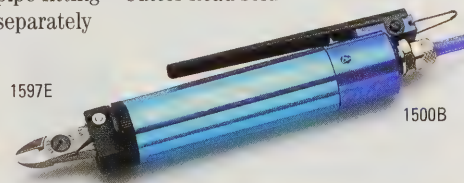


YR-259

P/N	Description	1	2+
YR-259	White, axial-reeling tape	\$90.85	\$84.90
YR-259L	Blue, reeling tape	90.85	84.90

## EREM Pneumatic Cutter

- Provides fast power-cutting for high-production applications
- Lightweight ergonomic design with MAGIC cutter heads (cutters ordered individually)
- Simple operation from standard factory air
- Power units complete with 4-1/2" hose and 1/8" pipe-fitting
- Cutter head sold separately



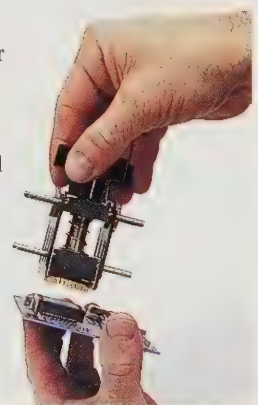
1597E

1500B

P/N	Description	1-11	12+
1500B	Pneumatic power unit	\$294.80	\$261.40
1503E	Cutter, angulated head, full-flush	133.80	118.60
1530E	Cutter, anti-shock, shear	141.75	125.65
1595E	Cutter, diagonal tapered head, full-flush	115.95	102.80
1597E	Cutter, diagonal round head, semi-flush	126.80	112.40

## OK INDUSTRIES PGA Insertion/Extraction Tool

- Pin-grid-array inserter and extractor easily adjusts to fit all sizes of PGAs from 9 x 9 to 26 x 26 pins
- One-hand operation lifts PGAs evenly without damage to device, board, or socket
- Includes heavy-duty storage case

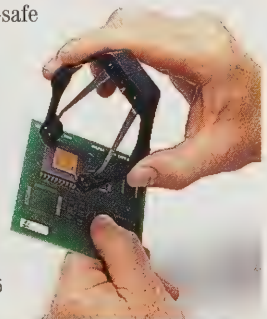


PGA-X

P/N	Description	Each
PGA-X	Universal PGA insertion/extraction tool	\$195.00

## OK INDUSTRIES Universal PLCC Extraction Tool

- Extracts PLCCs from 20 pins through 84 pins from any socket without damage to chip
- Spring-loaded, one-hand design requires no pulling—just squeeze handles and chip lifts from the socket
- ESD-safe handles for use on all static-safe components (EX-5)
- Machined stainless steel for long life (EX-5)
- EX-6: ABS handles and stamped steel



EX-5

P/N	Description	1-9	10+
EX-5	ESD-safe PLCC extraction tool	\$19.95	\$19.10
EX-6	Low-cost PLCC extractor (not shown)	7.95	7.60



## MICRO ELECTRONICS Insertion and Extraction Tools

### 102 DIP-A-DIP® and 203 PUL-A-DIP®

These tools are MOS compatible. The 102 is the only DIP insertion tool offered with an adjustable plunger plate to compensate for varying lead lengths of ICs.

- Small and lightweight
- A perfect fit for a woman's hand but not too small for a man



### 281 Universal PGA Extraction Tool

- No prior adjustment required • Automatically aligns to PGA size when inserting or extracting the device • Single-knob control of size and operation • Antistatic—every tool electrically conductive • 2 plungers (large and small) supplied with insertion tool • 4-sided grip

### 291 PUL-A-QILE®

- Universal PLCC extraction hand tool • Works on all JEDEC and PLCC sockets • Automatically drops the component after removal

P/N	Description	1-9	10+
102	14-pin/16-pin insertion tool	\$28.15	\$26.90
203	24-pin/28-pin extraction tool	36.60	33.00
281	Universal PGA extraction tool	399.95	360.00
291	PUL-A-QILE extraction tool	13.90	13.00

## EXTECH Counting Scale and PC/Printer Interface

This economical unit accurately counts and weighs components, resistors and more.

- Count, then press PRINT to transmit piece count, unit weight, and total weight via RS-232C directly to a printer or PC • Accurate to 0.01% FS • Weight displayed as net/gross, kg/lb • 110/220-V-AC power • Count accumulation to 999,999 pieces • Auto-zero and tare function • Overweight indication • Splash-proof keypad with audible feedback when a key is pressed • Model 160252 has 4-lb capacity with 0.00004-lb sample-count resolution • Model 160255 has 10-lb capacity • Scale: 9.5" x 12.3" x 3.1" • Pan: 8.7" x 8.3" • Weight: 10 lb



P/N	Description	Each
160252	Counting scale RS-232 interface 4 lb	\$599.00
160255	Counting scale RS-232 interface 10 lb	599.00
589240	RS-232 serial cable D15 to D25	19.00
76816F1-X	Mini serial printer III, 24 column	399.00

## DREMEL® MINIMITE™

MINIMITE 750 comes with the tool, removable battery pack, 3-hour charger, and 5 precision tool bits. It is small and compact, and designed for drilling, sanding, shaping, and precision detailing.

- Rugged shatter-resistant housing • 2-speed, on/off switch • Shaft-lock switch • Unique collet nut for fast bit changes

## DREMEL Variable-Speed MULTIPRO™ Super Kit

The 3956 MULTIPRO super kit features the 225 flex-shaft attachment and deluxe carrying case with removable accessory tray.

- Model 395 variable-speed MULTIPRO tool with quick-change collet nut, 1/8" collet, and wrench
- Model 225 flex-shaft attachment with 36"-long cable and 1/2"-diameter hand piece for precise fingertip control
- New deluxe storage case with removable accessory tray • 72 accessories/bits
- 175+ USES guide book



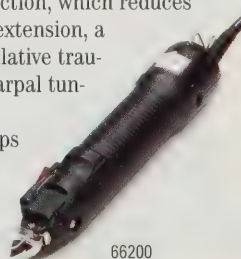
P/N	Description	1-5	6+
750-D	MINIMITE cordless tool	\$55.70	\$48.75
3956-D	MULTIPRO super kit	165.30	151.50

## ASG/JERGENS Lead Trimmer

The 66200 electronic lead-cutting tool is designed for large-volume work. Unlike air-powered trimming tools, it cuts without interruption—as long as you depress the switch. A lead-catcher is included to prevent cut leads from flying out. The 66200 allows you to vary both the cutting force and cutting speed to best fit your application.

Because it is an electric tool, there is no contaminated exhaust air to blow on your circuit boards. Additionally, the trimmer has an exceptionally gentle torque action, which reduces the likelihood of hyperextension, a common cause of cumulative trauma disorders such as carpal tunnel syndrome.

A variety of cutting tips are available, making the 66200 suitable for nearly all trimming tasks.



P/N	Description	1-4	5+
66200	Lead trimmer	\$532.50	\$475.00
66210	Oval semi-flush blade	60.00	54.00
66212	Oval semi-flush blade with carbide insert	135.00	120.75
66214	Oval relieved blade for flush cutting	75.00	67.00
66216	Tapered semi-flush blade	86.40	77.25

## ASG/JERGENS Automated Tape Dispensers

An automated tape dispenser is fast. Your assemblers do not have to fool with tearing individual pieces of tape from a traditional dispenser—when they reach for a piece of tape, it's there. They always get the length they specify,  $\pm 2$  mm (.08"). Lengths are fully adjustable.

Precision steel-cutting blades in the dispensers guarantee a clean cut every time. Dispensers are available for the following tapes: vinyl, masking, cellophane, polyethylene, paper, acetate, cloth, cotton cloth, MYLAR®, KAPTON®, antistatic, polimide, glass cloth, aluminum foil, double-sided, TEFLON®, NOMEX®, glass filament, and others.

Contrast an operator's repetitive movements using a traditional dispenser to those with an automated dispenser—there are no sudden twisting or torque-like actions. They simply pick up the piece of tape that is presented.

Because each piece of dispensed tape is perfect—no tears, twists, crooked cuts, or wrong lengths—you save on material.

These machines give your products a uniform, professional appearance—time after time.

### Model 2000

- Accepts tape widths from .12" to .99" wide (3 mm to 25 mm) • Cuts lengths from .51 to 2.37" (13 mm to 60 mm) • Allows up to 10 pieces of tape to be cut at the touch of a button • Unique feed system places tape on carousel for easy removal

### Model 3000

- Designed for continuous industrial application • Cuts virtually any tape • Variable dispensing intervals • Manual or automatic dispensing • Fully-enclosed metal cabinet



66102



66100

P/N	Description	Each
66100	ASG/JERGENS E-Z CUT 2000	\$782.00
66102	ASG/JERGENS E-Z CUT 3000	1860.00



## SIMONDS Miniature SQUEEZE-EZE

• Lightweight air-operated tools for cutting and crimping in printed-circuit and electronic applications • Designed for use with small cutting and crimping jaws • Rapid, easy interchange of jaw-sets • For longest jaw-life, maximum recommended air pressure is 60 psi for cutting and 80 psi for crimping • For hand-operation, each unit equipped with squeeze-lever and internal air valve, a 5' air hose, and a swiveling-suspension bracket to hold the tool when not in use



P/N	Description	1-5	6+
MSP-1	Miniature actuator	\$196.40	\$183.25
MSP-1F	Foot-operated tool (supplied with #103 foot-operated valve, 5' hose, swivel-tool hanger, hex. keys for changing jaw-sets)	215.30	200.90

## Jaws

Filament shears for cutting fine wire, nickel ribbon, or soft wire of any metal up to 3/32" diameter

P/N	Description	1-5	6+
MFS-1	Miniature filament shears	\$71.90	\$67.10

## Cut-and-Crimp Jaws

• Shears soft wire at a specified "rise" above the working surface and flattens the rise so it's mechanically secure before soldering • Jaws identified by the suffix "SR" do not include the crimp feature. By special order they can be furnished to cut at rise distances: .3"- .060"

P/N	Max. Soft Wire	Rise	Angle of Cut	Length	1-5	6+
SMCC-1	.030"	.030"	35°	3/32"	\$60.90	\$56.85
MVCC-1	.030"	.030"	90°	3/32"	60.90	56.85

## Dyke-Type Jaws

• Secured in the jaw-housing by a shouldered pivot-screw with recessed hex. head so they can be easily reversed to facilitate right-hand or left-hand use • Can be removed and separated for sharpening • Interval between sharpenings can be maximized by operating the tool at the lowest air pressure that provides satisfactory results • Jaw-sets made of AISI-SI tool steel can be used interchangeably with MSP-1 actuator

P/N	Max. Soft Wire	Rise	Angle	Length of Cut	1-5	6+
MCD-1	.030"	.007"	15°	7/16"	\$60.90	\$56.85
MCD-2	.030"	.007"	15°	5/16"	60.90	56.85

NOTE: More jaws are available.

## SIMONDS SQUEEZE-EZE Power Packs

• Designed for use with cutting, crimping and clinching jaws • Integral jaw-housings of these actuators permit rapid interchange of any of the jaw-sets • Operate at air pressure 60 psi-100 psi • Actuator cam ensures that movement of the jaws can never exceed limits for safe operation • Jaws can be preset in neutral position by an adjustment-screw in the power pack • For hand operation, each pack is furnished with: squeeze lever, internal air valve, 5' air hose, and swiveling suspension bracket for holding the tool above the work area when not in use



SP-01

P/N	Force Rating	Cylinder Diameter	Air at 30 Strokes/min
SP-01	1221 lb	1-1/2"	.060 cu. ft
SP-02	1761 lb	1-3/4"	.090 cu. ft

P/N	Net Weight	1-5	6+
SP-01	11 oz	\$242.60	\$226.35
SP-02	13 oz	283.50	264.50

## Jaws

• For power packs SP-01 and SP-02 • Jaws are made of AISI-SI tool steel-hardened to 56/58R/C, rust-resistant black oxide finish • Secured in-the-jaw housing by a shouldered pivot screw with recessed hex. head • Can be easily reversed to facilitate left-hand or right-hand operation • Can be removed and separated for sharpening



## Cut-and Crimp-Jaws

P/N	Max. Soft Wire	Rise	Angle	Length of Cut	1-5	6+
CC-1	.050"	.040"	45°	3/8"	\$68.00	\$63.50

## Dyke-Type Jaws

P/N	Max. Soft Wire	Rise	Angle of Cut	Length	1-5	6+
CD-1 semi-flush	.060"	.007"	45°	7/16"	\$68.00	\$63.50
CD-11 flush	.060"	.007"	45°	7/16"	68.00	63.50

## Plastic-Gate Jaws

P/N	Max. Soft Wire	Angle	Length of Cut	1-5	6+
PGC-2	.090"	18°	7/8"	\$68.00	\$63.50

## SIMONDS Component Lead Processor

• Semiautomatic processing tool (CLP-274 shown) can process 1,200 pieces an hr • Operates at 40-60 psi by a foot-switch, included with unit • Dies available in 2 styles and are not included with unit • The forming dies provide a lock-in capability that allows the component to be spaced off the PCB and locked in, eliminating swagging or trace pads • Trimming dies cut to various lengths • Base material 10% glass-filled LEXAN • Power pack is aluminum 6061-T6



CLP-274

P/N	Description	1-5	6+
CLP-274	Component-lead processor	\$315.00	\$293.90

## Lead-Processor Transistor Dies (Not Included with Units)

P/N	Description	1-5	6+
CLP-020	Universal transistor trimming	\$108.20	\$100.95
CLP-021	Trim, stand-off and lock-in die TO 5 3/32" above board 1/16" board, 5/64" below board	210.00	195.95

## Lead-Processor Capacitor Dies

P/N	Description	1-5	6+
CLP-040	Universal capacitor "trimming" die with hole spacing in increments of .050" from .100" to .900"	\$108.20	100.95

NOTE: More dies are available.



We provide reduced pricing on large-quantity orders.



We are a full-service distributor with a broad range of the best products.



# M28 Series Engineer's Field-Service Tool Kits

## ROTO-CLASSIC Kit

Designed to service a wide range of electronic equipment, this popular kit can be used for a variety of applications including: computer field service, office-products repair, and automated-process maintenance. The tools are conveniently arranged on 2 removable pallets in a black polyethylene ROTO-CLASSIC case.

- 8" deep, for additional storage
- Size: 18 1/2" x 14" x 9"
- Weight: 19 lb



M28-9RBN

P/N	Description	1-4	5+
M28-9RBN	Black ROTO CLASSIC kit	\$575.40	\$534.30
M0-9RBN	Case and pallets only	209.25	194.30

## Clean-Room Kit

This kit is specially designed for clean-room applications. Its features include: an anodized frame with a specially treated white polyethylene that helps prevent the accumulation of contaminants, all-vinyl pallets made to withstand continuous cleaning with solvents, a unique valance that seals against dust, and military-style quarter-turn latches.

- Size: 18 1/2" x 13 1/4" x 6 3/4"
- Weight: 18 lb



M28-7PWN

P/N	Description	1-4	5+
M28-7PWN	Clean-room kit	\$644.65	\$598.55
M0-7PWN	Case and pallets only	275.40	255.70

## Field-Service Kit with Built-In Cart

This heavy-duty black-polyethylene case has a rugged built-in cart assembly for carrying extra cases or gear. It comes with built-in, low-profile, smooth-rolling rubber wheels; recessed handles that are flush with the case when collapsed; and metal rails that protect the case from stair or curb damage. All of the cart's components are hidden under a removable plastic tray.

- Size: 19" x 15 1/2" x 10 1/2"
- Weight: 26 lb



M28-11RCN

P/N	Description	1-4	5+
M28-11RCN	Kit with built-in luggage cart	\$729.25	\$677.15
M0-11RCN	Case and pallets only	363.10	337.15

### Each M28 Series Kit Includes the Following Tools:

<ul style="list-style-type: none"> <li>• Solder Aid (Brush, Fork)</li> <li>• Inspection Mirror</li> <li>• Metal Rule, 6"</li> <li>• Chain-Nose Pliers, 4"</li> <li>• Diagonal Cutter, 4"</li> <li>• Center Punch</li> <li>• Pin Punch, 1/16"</li> <li>• Pin Punch, 1/8"</li> <li>• Thickness Gauge, 15-Leaf</li> <li>• Offset Combo Screwdriver</li> <li>• Reverse-Action Tweezers</li> <li>• Burnishing Tools (3/pkg.)</li> <li>• Screw-Holding Screwdriver</li> </ul>	<ul style="list-style-type: none"> <li>• Solder (Pocket Pack)</li> <li>• Machinist Scriber</li> <li>• Internal-Ring Pliers</li> <li>• External-Ring Pliers</li> <li>• Deluxe Case</li> <li>• Electrician's Scissor</li> <li>• Adjustable Wrench, 4"</li> <li>• Adjustable Wrench, 8"</li> <li>• Diagonal Cutter, 5"</li> <li>• Long Nose with Cutter, 6"</li> <li>• Soldering Iron, 25 W</li> <li>• Precision Knife, #1</li> <li>• Regular Handle</li> <li>• Junior Handle</li> </ul>	<ul style="list-style-type: none"> <li>• Nut-Driver Blade, 3/16"</li> <li>• Nut-Driver Blade, 7/32"</li> <li>• Nut-Driver Blade, 1/4"</li> <li>• Nut-Driver Blade, 9/32"</li> <li>• Nut-Driver Blade, 5/16"</li> <li>• Nut-Driver Blade, 11/32"</li> <li>• Nut-Driver Blade, 3/8"</li> <li>• Nut-Driver Blade, 7/16"</li> <li>• Nut-Driver Blade, 1/2"</li> <li>• ALLEN Hex. Blade, .050"</li> <li>• ALLEN Hex. Blade, 1/16"</li> <li>• ALLEN Hex. Blade, 5/64"</li> <li>• ALLEN Hex. Blade, 3/32"</li> <li>• ALLEN Hex. Blade, 1/8"</li> </ul>	<ul style="list-style-type: none"> <li>• ALLEN Hex. Blade, 5/32"</li> <li>• ALLEN Hex. Blade, 3/16"</li> <li>• ALLEN Hex. Blade, 7/64"</li> <li>• ALLEN Hex. Blade, 9/64"</li> <li>• Spline Blade, .048"</li> <li>• Spline Blade, .060"</li> <li>• Spline Blade, .069"</li> <li>• Spline Blade, .072"</li> <li>• Spline Blade, .076"</li> <li>• Spline Blade, .096"</li> <li>• Slot Screwdriver, 1/4" x 4"</li> <li>• Slot Screwdriver, 1/4" x 4"</li> <li>• Slot Screwdriver, 1/8" x 2"</li> <li>• Slot Screwdriver, 1/8" x 8"</li> </ul>	<ul style="list-style-type: none"> <li>• Slot Screwdriver, 3/16" x 3"</li> <li>• Slot Screwdriver, 3/32" x 2"</li> <li>• Slot Screwdriver, 5/16" x 6"</li> <li>• Slot Screwdriver, 1/4" x 1"</li> <li>• PHILLIPS Screwdriver, #0</li> <li>• PHILLIPS Screwdriver, #1</li> <li>• PHILLIPS Screwdriver, #2</li> <li>• SUPER-CHAMP Crimp Tool</li> <li>• Alignment Tool (Nonmetallic)</li> <li>• Alignment Tool, Duplex</li> <li>• T7 Wire Stripper</li> <li>• Electrician's Knife</li> </ul>
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## Complete LAN-Maintenance Kit

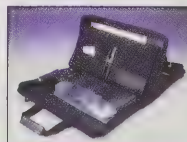
This is the custom-tailored, installation-and-repair solution that meets all the needs of a network supervisor or LAN manager. The kit includes the necessary tools and supplies for maintaining the physical integrity of networks, PCs, printers, and peripherals. It includes a complete set of network-specific tools and test adapters, plus everything needed to install premise wiring, attach cable connectors, repair boards, and perform basic network troubleshooting.

The deluxe 3-sided case has a side with 2 full pallets of tools and adapters; a side with compartments for paperwork and manuals, plus a modular pallet for topology-specific tools; and an exterior side with a full-size pouch for holding documents or manuals, plus 3 divided pouches for test gear or spare parts.

- Medium-grey durable CORDURA
- Detachable shoulder strap
- Size: 15 1/2" x 10 1/2" x 5"
- Weight: 14 lb



M350-5LBN



P/N	Description	1-4	5+
M350-5LBN	LAN-maintenance kit	\$475.40	\$441.50
M0-5LBN	Case and pallets only	135.40	125.70

### The LAN Kit Includes the Following Tools:

<ul style="list-style-type: none"> <li>• Slip-Joint Pliers, 6"</li> <li>• Chain-Nose Plier, 4"</li> <li>• Diagonal Cutter, 4"</li> <li>• Solder (Pocket Pack)</li> <li>• Two-Sided Black (Imperial)</li> <li>• Electrician's Scissor</li> <li>• Adjustable Wrench, 6"</li> <li>• Slot and PHILLIPS Screw-Holder</li> <li>• Long-Nose with Cutter, 6"</li> <li>• Soldering Iron, 25 W, 3-Way</li> <li>• Precision Knife, #1</li> <li>• PHILLIPS Screwdriver, #0</li> <li>• Slot Screwdriver, 1/8" x 4"</li> <li>• Slot screwdriver, 3/32" x 2"</li> <li>• Slot screwdriver, 5/16" x 4"</li> <li>• PHILLIPS Screwdriver, #0</li> <li>• PHILLIPS Screwdriver, #1</li> <li>• PHILLIPS Screwdriver, #2</li> <li>• TORX Driver, T10</li> </ul>	<ul style="list-style-type: none"> <li>• TORX Driver, T15</li> <li>• TORX Driver, T20</li> <li>• TORX Driver, T25</li> <li>• Ball-Driver Hex. Key Set</li> <li>• Metric Ball-Driver Key Set</li> <li>• Pocket Flashlight</li> <li>• Coaxial Cable Cutter</li> <li>• Standard Locking Pliers, 5"</li> <li>• Desolder Braid, 5' Spool</li> <li>• T6 Stripper (45-1829)</li> <li>• Universal Cable, 4'</li> <li>• Gender Changer, DB25 F-F</li> <li>• Gender Changer, DB25 M-M</li> <li>• Wrist-Strap Set, 12'</li> <li>• RJ45 Coupler TDG1026-8C</li> <li>• RJ45 Telco Cable (14')</li> <li>• RJ11 Cable (14')</li> <li>• Telephone-Line Tester</li> <li>• 3-Wire Circuit Tester</li> <li>• Deluxe Parts Box</li> </ul>
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## Computer Service Kit

A good kit for servicing computers, terminals, and printers, it is also ideal for most types of electronic equipment.

- Basic assortment of tools • Economical black CORDURA zipper case
- Size: 15" x 10 1/2" x 2 1/2"
- Weight: 8 lb

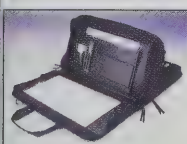


M105-3BN

## Double-Sided Computer Service Kit

This model is the same as the single-sided kit but with the following added features: 9" x 12" document pouch, low-profile clipboard, business-card pocket, various smaller pockets, and large exterior pouches to carry additional tools, test equipment, or documentation.

- Size: 18" x 11" x 5" • Weight: 11 lb



Document Side



Tool Side

M105-X5BN

### Kit Includes

- |                              |                                |
|------------------------------|--------------------------------|
| • Slip-Joint Pliers, 6"      | • Nut-Driver Blade, 5/16"      |
| • Metal Rule, 6"             | • Nut-Driver Blade, 11/32"     |
| • 6-pc. Short Arm (88021)    | • Nut-Driver Blade, 3/8"       |
| • Jeweler's Screwdriver      | • Nut-Driver Blade, 7/16"      |
| • Combo Spring-Hook Tool     | • Nut-Driver Blade, 1/2"       |
| • Screw-Holding Driver       | • Screwdriver Blade, 1/8"      |
| • Solder (Pocket Pack)       | • Screwdriver Blade, 1/4"      |
| • Offset Slot Screwdriver    | • Screwdriver Blade, 3/16"     |
| • Offset PHILLIPS Driver     | • PHILLIPS Blade, #0           |
| • Rev. Retaining-Ring Pliers | • PHILLIPS Blade, #1           |
| • Adjustable Wrench, 6"      | • PHILLIPS Blade, #2           |
| • Solder Iron, 25-W          | • PHILLIPS Screwdriver, #0     |
| • Desoldering Bulb           | • Slot Screwdriver, 3/32" x 3" |
| • Diagonal Cutter, 5"        | • Ignition Wrench, 7/32"       |
| • Long-Nose with Cutter      | • Ignition Wrench, 1/4"        |
| • Blade Extension, 7"        | • Ignition Wrench, 9/32"       |
| • Regular Handle             | • Ignition Wrench, 3/8"        |
| • Junior Handle              | • Ignition Wrench, 7/16"       |
| • Nut-Driver Blade, 3/16"    | • Fuse Puller (34-1026)        |
| • Nut-Driver Blade, 7/32"    | • T6 Stripper (45-1829)        |
| • Nut-Driver Blade, 1/4"     | • Telephone-Line Tester        |
| • Nut-Driver Blade, 9/32"    | • CORDURA Zipper Case          |

## Basic Repair Kit

This compact, portable service kit houses the perfect "occasional" tool set. Small enough to fit into a briefcase or suitcase, it's ideal for anyone who doesn't require a full-size kit.

As small as this case is, it holds a surprisingly wide assortment of high-quality, conveniently arranged tools—all the basic tools a field engineer needs to install, service, or repair sophisticated electronic equipment.

The carefully selected assortment of tools includes soldering equipment, adjustable wrench, slot and PHILLIPS screwdrivers, adjustable wire stripper, alignment tool, pliers/cutters, and more.

All of the tools and supplies listed below come neatly arranged in a compact vinyl tool case. It has a wide variety of different-size, high-quality stitched pockets to accommodate the most commonly used tools. The kit features a heavy-duty zipper and very durable slip-up handles for ease of use.

- Size: 18" x 11" x 5" • Weight: 11 lb

### Kit Includes

- |                               |                                |
|-------------------------------|--------------------------------|
| • Solder Aid (Hook, Fork)     | • Junior Handle                |
| • Metal Rule, 6"              | • Screwdriver Blade, 1/4"      |
| • 6-pc. Short Arm (88021)     | • Screwdriver Blade, 3/16"     |
| • Chain-Nose Pliers, 4"       | • PHILLIPS Blade, #0           |
| • Diagonal Cutter, 4"         | • PHILLIPS Blade, #1           |
| • Solder (Pocket Pack)        | • PHILLIPS Blade, #2           |
| • Electrician's Scissors      | • PHILLIPS Screwdriver, #0     |
| • Adjustable Wrench, 4"       | • Slot Screwdriver, 3/32" x 2" |
| • Soldering Iron, 25 W, 3-Way | • Adjustable Wire Stripper     |
| • Desoldering Bulb            | • Alignment Tool (Nonmetallic) |
| • Precision Knife, #1         | • Desolder Braid, 5' Spool     |
|                               | • Compact Zipper Case          |



M62-5BN

P/N	Description	1-4	5+
M62-5BN	Basic repair kit	\$166.15	\$154.30
M0-5BN	Case only	40.00	37.15



*New Product: This symbol represents the industry's latest offerings.*



*We accept fax orders 24 hours a day, 7 days a week.*



*We provide telephone technical assistance with your purchases.*

## Static-Conductive Bench Kit

As a general-purpose service kit, it features professional, top-quality tools that are specially selected for the bench technician or inspecting engineer facing a variety of assemblies. All of the tools necessary to quickly complete basic electronics-assembly tasks are assembled into a strong, neatly organized, compact, static-conductive tool box.

This comprehensive selection of tools enables you to address all the regular production-line tasks (soldering, component forming, wiring, and pcb stuffing). The kit includes: screwdrivers, nut drivers, pliers/cutters, soldering iron, accessories, and adjusting and specialty tools.

The sturdy black conductive tool box is designed for maximum strength and static protection, yet it is lightweight, has a comfortable full-grip handle, and provides plenty of carrying space for tools and supplies. It also has a handy lift-out tray that conveniently holds smaller items—leaving more space for larger items in the lower well.

The tool box is molded from carbon-filled high-impact material which, because of its conductive properties, makes it ideal for the storage, protection, and transportation of static-sensitive parts.

- Size: 15" x 5.2" x 5.75" • Weight: 5.6 lb

### Kit Includes

- |                             |                                |
|-----------------------------|--------------------------------|
| • Solder Aid (Reamer, Fork) | • 6" Needle File (Flat)        |
| • Steel Solder Brush (TK)   | • Diagonal Cutter, 5" (41-5)   |
| • Slip-Joint Pliers, 6"     | • Long-Nose with Cutter, 6"    |
| • Metal Rule, 6"            | • Soldering Iron, 25 W         |
| • 6-pc. Short Arm (88021)   | • Heavy-Duty Knife             |
| • Chain-Nose Pliers, 4"     | • Miniature Nut-Driver Set     |
| • Diagonal Cutter, 4"       | • Slot Screwdriver, 1/4" x 4"  |
| • Reverse-Action Tweezers   | • Slot Screwdriver, 1/8" x 3"  |
| • Fiberglass Solder Aid     | • Slot Screwdriver, 1/8" x 4"  |
| • Solder (Pocket Pak)       | • Slot Screwdriver, 5/16" x 6" |
| • Machinist Scribe          | • Slot screwdriver, 5/32" x 3" |
| • Electrician's Scissors    | • PHILLIPS Screwdriver, #1     |
| • Adjustable Wrench, 6"     | • Adjustable Wire Stripper     |
| • 6" Needle File (Round)    | • Conductive Tool Box          |



M416-6CBN

P/N	Description	1-4	5+
M105-3BN	Computer service kit	\$347.70	\$332.85
M0-3BN	Case only	84.60	78.60
M105-X5BN	Double-sided computer service kit	407.70	378.60
M0-X5BN	Double-sided case only	143.10	132.85

P/N	Description	Each
M416-6CBN	Conductive bench kit	\$258.50
14800-2C	Box only, conductive	33.00



# KESTER Solder Paste



KESTER manufactures a wide variety of solder-paste products designed for use in surface-mount assembly. KESTER solder pastes are manufactured to exacting standards from the highest quality, oxide-free powder in a clean-room-type environment. The formulations are manufactured to strict internal specifications which eliminate solder balling. Other formulations, alloys, and packaging options are available by special order. Refrigerate solder paste to extend its usable life.

## From the bench

### TRENDS IN SOLDER PASTE

Courtesy of Kester

In the past KESTER concentrated on solder-paste formulas for the traditional RMA (rosin, mildly activated) fluxes. But government regulations deterred the use of rosin-residue cleaning solvents in soldering applications, and RMA fluxes became obsolete—which caused demand for RMA solder-paste products to decrease considerably.

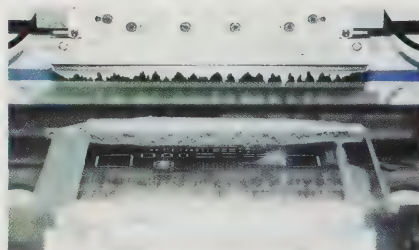
Presently, KESTER's solder-paste product line includes traditional RMA, water-soluble, and no-clean formulations. As the market's needs change, so does KESTER's product-development direction. While the demand for RMA products decreases steadily, demand for no-clean and water-soluble products is dramatically increasing. The key characteristic of water-soluble products, is resistance to extreme temperatures and humidity, while the key characteristics of no-clean products are residue reduction, residue probe-ability (for testing purposes), aesthetic qualities, and long-term product reliability.

Future products will show improvements in solder-paste working life, shelf life, reliability, soldering capability (flux activity), and aesthetic qualities. Since customer demand for no-clean products versus other technologies is on the rise, most new products will be developed for "no-clean" customers.



Need Help? Just Call

Water-Soluble Solder Paste				
Flux Vehicle	WS-851	WS-861	WS-751	WS-761
Description	Standard WS formula for all stencil-printing applications down to 16 mil	Standard WS formula for syringe dispensing (rework)	Standard WS paste for high-strength stencil-printing applications	Syringe-dispensable WS paste for high-strength applications
How to Clean	Use de-ionized or soft tap water at 130 °F–150 °F	Use de-ionized or soft tap water at 130 °F–150 °F	Use de-ionized or soft tap water at 130 °F–150 °F	Use de-ionized or soft tap water at 130 °F–150 °F
Alloy	63Sn/37Pb	63Sn/37Pb	62Sn/36Pb/2Ag	62Sn/36Pb/2Ag
Packaging	500-g jar	25-g syringe	500-g jar	25-g syringe
Complies With	ANSI-J-STD-004	ANSI-J-STD-004	ANSI-J-STD-004	ANSI-J-STD-004
	Classification ORM0	Classification ORM0	Classification ORM0	Classification ORM0
No-Clean Solder Paste				
Flux Vehicle	NC-830	NC-840	NC-730	NC-740
Description	Full-residue, standard no-clean paste for all stencil printing applications	Full-residue, standard no-clean paste for all syringe applications	Full-residue, standard no-clean paste for all stencil-printing applications	Full-residue, standard no-clean paste for all syringe applications
Alloy	63Sn/37Pb	63Sn/37Pb	62Sn/36Pb/2Ag	62Sn/36Pb/2Ag
Residue Color	Amber	Amber	Amber	Amber
Tack Life	8+ hr	8+ hr	8+ hr	8+ hr
Atmosphere Required for Reflow	Air or nitrogen	Air or nitrogen	Air or nitrogen	Air or nitrogen
Packaging	500-g jar	25-g syringe	500-g jar	25-g syringe
Complies With	Bellcore TR-NWT-000078	Bellcore TR-NWT-000078	Bellcore TR-NWT-000078	Bellcore TR-NWT-000078
	Issue 3 ANSI-J-STD-004	Issue 3 ANSI-J-STD-004	Issue 3 ANSI-J-STD-004	Issue 3 ANSI-J-STD-004
	Classification ROL0	Classification ROL0	Classification ROL0	Classification ROL0
Rosin-Based Solder Paste				
Type	RMA	RMA	RMA	RMA
Flux Vehicle	RMA-810	RMA-820	RMA-710	RMA-720
Description	Standard RMA paste for all stencil-printing applications	Standard syringe-dispensable RMA solder paste	RMA paste for high-strength applications	Syringe-dispensable RMA paste for high-strength applications
How to Clean	Kester 5240 solvent or 5768 saponifier	Kester 5240 solvent or 5768 saponifier	Kester 5240 solvent or 5768 saponifier	Kester 5240 solvent or 5768 saponifier
Alloy	63Sn/37Pb	63Sn/37Pb	62Sn/36Pb/2Ag	62Sn/36Pb/2Ag
Packaging	500-g jar	25-g syringe	500-g jar	25-g syringe
Complies With	ANSI-J-STD-004 Classification ROL1	ANSI-J-STD-004 Classification ROL1	ANSI-J-STD-004 Classification ROL1	ANSI-J-STD-004 Classification ROL1



**KESTER products have been tested and conform to:**

Soldering Fluxes—ANSI/J-STD-004 or MIL-F-14256

Solder Paste—ANSI/J-STD-005 or QQ-S-571

Solder—ANSI/J-STD-006 or QQ-S-571

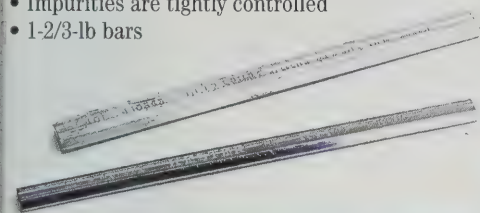
P/N	Description	Alloy	Packaging	1-9	10-49	50+
Solder Pastes for Standard or Fine-Pitch Stencil Application						
RMA-710	Mildly-activated rosin	62/36/2Ag	500-g jar	\$75.00	\$62.50	\$57.70
NC-730	Safe residue "no-clean"	62/36/2Ag	500-g jar	75.00	62.50	57.70
WS-750	Water washable with R593 flux	62/36/2Ag	500-g jar	75.00	62.50	57.70
WS-751	Water washable with R596 flux	62/36/2Ag	500-g jar	75.00	62.50	57.70
RMA 810	Mildly-activated rosin	63Sn/37Pb	500-g jar	70.00	58.35	53.85
NC-830	Safe residue "no-clean"	63Sn/37Pb	500-g jar	70.00	58.35	53.85
WS-850	Water washable with R593 flux	63Sn/37Pb	500-g jar	70.00	58.35	53.85
WS-851	Water washable with R596 flux	63Sn/37Pb	500-g jar	70.00	58.35	53.85
Solder Pastes for Syringe-Dispensing Applications						
RMA-720	Mildly-activated rosin	62/36/2Ag	25-g syringe	12.00	10.00	9.25
NC-740	Safe residue "no-clean"	62/36/2Ag	25-g syringe	12.00	10.00	9.25
WS-760	Water washable with R593 flux	62/36/2Ag	25-g syringe	12.00	10.00	9.25
WS-761	Water washable with R596 flux	62/36/2Ag	25-g syringe	12.00	10.00	9.25
RMA 820	Mildly-activated rosin	63Sn/37Pb	25-g syringe	11.00	9.15	8.45
NC-840	Safe residue "no-clean"	63Sn/37Pb	25-g syringe	11.00	9.15	8.45
WS-860	Water washable with R593 flux	63Sn/37Pb	25-g syringe	11.00	9.15	8.45
WS-861	Water washable with R596 flux	63Sn/37Pb	25-g syringe	11.00	9.15	8.45



## KESTER ULTRAPURE® Bar Solder

This is the highest-quality bar solder available. Strict controls are maintained throughout every step of the proprietary manufacturing process.

- Impurities are tightly controlled
- 1-2/3-lb bars



P/N	Description	25	50-100	125+
KB18	63Sn/37Pb ULTRAPURE bar solder	\$4.90	\$4.10	\$3.50
KB19	60Sn/40Pb ULTRAPURE bar solder	4.70	3.95	3.40

Note: All bar solder sold in 25-lb cartons.

## KESTER Extruded E-Bar Solder

KESTER E-bar solder is made from grade-A virgin metals and manufactured under a controlled process to produce a high-purity solder.

- 1-lb bars

P/N	Description	25	50-100	125+
KB23	63Sn/37Pb bar	\$4.80	\$4.00	\$3.45
KB25	60Sn/40Pb bar	4.60	3.85	3.30

Note: All bar solder sold in 25-lb cartons.

## KESTER 44 Activated Rosin Solder

"44" activated rosin-core solder is noncorrosive and nonconductive with excellent wetting action for fast, efficient soldering. "44" meets: ANSI-J-STD-004 Classification ROM1 and IPC-SF-818 Type M3CN.



P/N	Alloy	Diameter	1-19	20-49	50+
602A31	60Sn/40Pb	.020"	\$12.75	\$9.10	\$8.50
603A31	60Sn/40Pb	.025"	8.65	6.15	5.75
604A31	60Sn/40Pb	.031"	7.80	5.55	5.20
605A31	60Sn/40Pb	.040"	7.90	5.65	5.30
606A31	60Sn/40Pb	.050"	7.70	5.50	5.20
607A31	60Sn/40Pb	.062"	7.10	5.10	4.75
632A31	63Sn/37Pb	.020"	12.90	9.25	8.60
633A31	63Sn/37Pb	.025"	10.10	7.20	6.75
634A31	63Sn/37Pb	.031"	8.00	5.70	5.35
635A31	63Sn/37Pb	.040"	8.40	6.00	5.60
637A31	63Sn/37Pb	.062"	8.20	6.10	5.70

## KESTER ULTRAPURE Low-Dross Bar Solder

KESTER ULTRAPURE low-dross is formulated with a special low-dross additive that dramatically decreases dross formation in the solder pot. Lower dross formation decreases joint-weakening inclusions in the solder, keeps surface tension low, and decreases costly solder loss through drossing.

- 1-2/3-lb bars

P/N	Description	25	50-100	125+
KB18LO	Sn63/Pb37 ULTRAPURE low-dross bar solder	\$5.00	\$4.20	\$3.60

Note: All bar solder sold in 25-lb cartons.

**ALL BAR SOLDER MEETS OR EXCEEDS  
ANSI-J-STD-006 AND ASTM-B32**

# SPECIAL OFFER!

Buy 500 lbs of BAR SOLDER and  
receive a FREE  
Option A Solder Analysis.

Note: Bar Solder must ship  
at one time to one location.  
No substitutions allowed.

## KESTER 285 Mildly Activated Rosin Solder

"285" is a mildly activated rosin-core wire. Its fluxing ability is much greater than that of ordinary RMA fluxes and it is nearly comparable to Type-RA fluxes. It meets ANSI-J-STD-004 Classification ROL1; Military Qualified Products List, Type WRMA; and MIL-F-14256 Type RMA.

P/N	Alloy	Diameter	1-19	20-49	50+
602E31	60Sn/40Pb	.020"	\$16.70	\$11.95	\$11.15
604E31	60Sn/40Pb	.031"	11.50	8.20	7.70
607E31	60Sn/40Pb	.062"	9.70	6.90	6.45
632E31	63Sn/37Pb	.020"	13.65	9.75	9.10
633E31	63Sn/37Pb	.025"	10.10	7.20	6.75
634E31	63Sn/37Pb	.031"	8.90	6.35	5.90
637E31	63Sn/37Pb	.062"	8.00	5.70	5.30

## KESTER 245 Low-Residue Flux Solder

"245" provides both the soldering performance of an activated rosin flux and the clean appearance of a low-residue "no-clean". It meets ANSI-J-STD-006 Classification ROL0, BELLCORE Issue 3 TR-NWT-000078, and IPC-SF-818 Type LR3CN.

P/N	Alloy	Diameter	1-19	20-49	50+
604NC11	60Sn/40Pb	.031"	\$8.05	\$5.90	\$5.50
632NC11	63Sn/37Pb	.020"	12.15	8.65	8.10
633NC11	63Sn/37Pb	.025"	8.80	6.30	5.90

Continued

## KESTER Solder-Analysis Program

This prepaid program is designed to ensure that the solder you are using has the correct formulation for your specific operation. By simply selecting the analysis option which best meets your needs, you can maintain the quality required.

### KESTER Solder-Analysis Program

Option A		Option C		
Tin	Copper	Tin	Copper	Antimony
Antimony	Gold	Gold	Cadmium	Aluminum
		Zinc	Iron	Arsenic
		Bismuth	Silver	Nickel
Option D				
Tin	Copper	Antimony		
Gold	Cadmium	Aluminum		
Zinc	Iron	Arsenic		
Bismuth	Silver	Nickel		
	Sulfur	Phosphorous		

P/N	Description	Each
Option A	Solder-analysis program	\$26.60
Option C	Solder-analysis program	43.30
Option D	Solder-analysis program	76.60



We provide telephone technical assistance with your purchases.



We are a full-service distributor with a broad range of the best products.

P/N	Alloy	Diameter	1-19	20-49	50+
634NC11	63Sn/37Pb	.031"	8.05	5.75	5.35
637NC11	63Sn/37Pb	.062"	8.00	5.70	5.30

## KESTER 331 Water-Soluble Solder

This water-soluble solder is more active than rosin fluxes for soldering difficult metals. This flux is more heat stable than other organic fluxes—resulting in minimal smoke and odor. Its residue can be removed with a warm-water rinse. It meets ANSI-J-STD-004 Classification ORH1 and IPC-SF-818 Type H3C.

P/N	Alloy	Diameter	1-19	20-49	50+
602N31	60Sn/40Pb	.020"	\$16.70	\$11.95	\$11.15
603N31	60Sn/40Pb	.025"	11.15	8.00	7.45
604N31	60Sn/40Pb	.031"	8.20	6.10	5.70
632N31	63Sn/37Pb	.020"	12.15	8.65	8.10
634N31	63Sn/37Pb	.031"	8.00	5.70	5.30
637N31	63Sn/37Pb	.062"	8.00	5.70	5.30

## KESTER HF-1189 CF Water-Soluble Solder

This is the cored-solder version of the HF-1189 VOC, CFC, and halide-free, water-soluble soldering flux.

P/N	Alloy	Diameter	1-19	20-49	50+
632HF31	63Sn/37Pb	.020"	\$23.00	\$16.40	\$15.35
633HF31	63Sn/37Pb	.025"	14.90	10.65	9.95
634HF31	63Sn/37Pb	.031"	12.80	9.15	8.50



## KESTER Rosin-Based Fluxes

KESTER rosin fluxes are formulated with high-quality purified rosin, conforming to LLL-R-626 in specially blended solvent systems. The choice of the proper flux formula is based on the soldering application, desired rosin percentage, type of solvent, and the activity level required.



Flux Type	"R"	"RMA"	"RA"	"RA"
Product #	145	186 Series	1544	1580 Series
Percent Solids	25%	18%–36%	50%	20%–36%
Percent Halides	0%	0.02%	0.44%	0.22%–0.44%
Product Characteristics	Excellent for test procedures specified by military and commercial industries designed to test solderability.	These fluxes have the highest level of activity for Type-RMA fluxes. They were developed for use in critical applications where difficult assemblies are to be soldered but process requirements stipulate the use of Type-RMA fluxes. These fluxes possess high thermal stability for soldering multilayered assemblies which require high preheat temperatures. Formulas 186-18 and 186-25 are more suitable for SMT assemblies.	This is KESTER's active, noncorrosive rosin-type flux. It features an excellent wetting action and can be used on surfaces which are difficult to solder.	These activated formulations are designed for applications with high-speed wave soldering. Varied solids contents available.
Compliant Specification	MIL-F-14256F IPC-SF-818 LR3CN	ANSI-J-STD-004 Classification ROL1 MIL-F-14256 for Type-RMA flux	ANSI-J-STD-004 Classification ROM1; MIL-S-6872A Section 5.2.1 and Section 4.4.1; O-F-506-B Type 1, Form B; LLL-R-626 Pure WVV gum rosin; IPC-SF-818 Type MR3C	IPC-SF-818 Type MR3C
Residue Removal	Residue is non-corrosive; however, solvent or water-wash with KESTER BIO-KLEEN at 7% solution to remove all residue.	Residues are non-corrosive; however, solvent or water-wash with KESTER BIO-KLEEN at 7% solution to remove all residue.	Residue is non-corrosive, but may be solvent-cleaned or washed with KESTER BIO-KLEEN saponifier at 7%–10% concentrate in water (120 °F–140 °F).	Residues are non-corrosive, but may be solvent-cleaned or washed with KESTER BIO-KLEEN saponifier at 7%–10% concentrate in water (120 °F–140 °F).

P/N	Description	Each Gal
145-GAL	Mildly activated flux, 4 gal per carton	\$19.75
186-GAL	RMA flux, 36% solids, 4 gal per carton	29.75
186-18-GAL	RMA flux, 18% solids, 4 gal per carton	23.85
186-25-GAL	RMA flux, 25% solids, 4 gal per carton	26.00
1544-GAL	RA flux 50% solids, 4 gal per carton	24.00
1544-MIL-GAL	Conforms to MIL-F-14256, Type RA, 4 gal per carton	23.75
1585-GAL	RA flux 36% solids, 4 gal per carton	24.30
1585-MIL-GAL	Conforms to MIL-F-14256, Type RA, 4 gal per carton	24.30
1587-GAL	RA flux, 25% solids, 4 gal per carton	28.70
1587-MIL-GAL	Conforms to MIL-F-14256, Type RA, 4 gal per carton	28.70
1588-GAL	RA flux, 20% solids, 4 gal per carton	24.00

NOTE: Single gallons come standard in a carton of 4. Also available in 1-gallon packs and 5- and 53-gallon containers.

## KESTER Water-Soluble Fluxes

KESTER offers a wide assortment of water-soluble fluxes which provide better fluxing abilities and wider processing windows than do traditional rosin fluxes. Water cleaning is a popular alternative to CFC-solvent cleaning (now eliminated). Water-soluble flux residues are designed to be removed with either in-line or batch hot-water cleaning processes. Please note: a circuit board's design must be compatible with the use of organic fluxes and water cleaning since all of the residue must be removed and the components must be able to tolerate water.



Water-Soluble Fluxes				
Flux Type	VOC-Free Organic Water-Soluble	Organic Water-Soluble	Organic Water-Soluble	Neutral pH Organic Water-Soluble
Product Number	HF-1189	2235	2224-25	2331-ZX
Percent Solids	40%	11%	24%	33%
Percent VOCs	0%	763 g/liter or 89%	650 g/liter or 75%	729 g/liter or 75%
Percent Halides	0%	1.5%	1.5%	2.2%
Product Characteristics	VOC-free, halide-free, citric-acid-based, water-based flux-developed by HUGHES.	This very active flux features low solids designed for surface-mount assemblies. Low-solids content results in reduced skips on bottom side surface-mount pads. The circuit boards exhibit high ionic cleanliness after water cleaning.	Highly active organic. Designed for automated wave-soldering applications.	This pH-neutral water-soluble flux is ideally suited for automatic wave- and drag-soldering. Several operations can be performed before the required cleaning is done.
Compliant Specifications	MIL-F-14256F Type WSF-0 QPL-listed	ANSI-J-STD-004 Classification ORH1	IPC-SF-818 Type H3C	ANSI-J-STD-004 Classification ORH1 MIL-P-28809A
Cleaning Recommendations	Residue removal is required. Use soft or deionized water at temperatures of 120 °F–150 °F	Residue removal is required. Use soft or deionized water at temperatures of 120 °F–150 °F	Residue removal is required. Use soft or deionized water at temperatures of 120 °F–150 °F	Residue removal is required. Use soft or deionized water at temperatures of 120 °F–150 °F

P/N	Description	Each Gal
HF-1189-GAL	Water-soluble flux, 40% solids, 4 gal per carton	\$46.40
HF-1189A-GAL	Water-soluble flux, 44% solids, 4 gal per carton	50.15
2235-GAL	Organic water-soluble flux, 11% solids, 4 gal per carton	24.00
2224-25-GAL	Organic water-soluble flux, 24% solids, 4 gal per carton	22.30
2331-ZX-GAL	Organic water-soluble flux, 33% solids, 4 gal per carton	25.70

NOTE: Single gallons come standard in a carton of 4. Also available in 1-gallon packs and 5- and 53-gallon containers.

NOTE: Kester chemicals in single gallons are sold in cartons of 3 or 4. Also available in 1-gallon packs and 5- and 53-gallon containers.



## KESTER No-Clean Fluxes

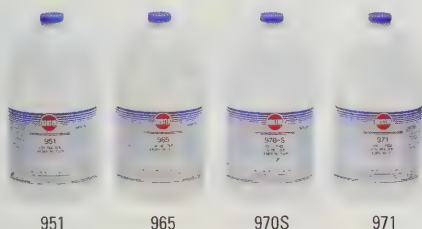
KESTER SM fluxes are formulated to meet the changing requirements of today's soldering operations. Designed for wave-soldering conventional and surface-mount circuit board assemblies, these extremely low-solid-content fluxes leave practically no residue after soldering. Boards are dry and cosmetically clean as they exit the wave-solder machine. There are no residues to interfere with electrical-test probes—and the expense of cleaning is eliminated. KESTER is a leader in "no-clean" flux technology—and reliability considerations are a prime concern in development of SM-flux formulations. KESTER SM fluxes are formulated to provide good activity and are halogen-free, noncorrosive, and have no surface-insulation-resistance degradation. No offensive odors are given off during soldering.

KESTER SM fluxes provide an environmentally-safe alternative to solvent-cleaning operations which produce CFC emissions and harm the earth's ozone layer. The elimination of the cleaning process creates a tremendous cost savings in terms of equipment, facilities, and energy costs. Costs for disposal of waste solvents and treatment of waste water are also eliminated.

## KESTER VOC-Free No-Clean Fluxes

KESTER is pleased to introduce a major breakthrough in the development of environmentally-friendly soldering fluxes that emit no volatile organic compounds (VOCs). These VOC-free, no-clean fluxes are water-based, water-soluble, halide-free, and free of ozone-depleting chemicals.

No offensive odors are given off during soldering.



951

965

970S

971

No-Clean Fluxes				
Flux Type	Alcohol-Based		VOC-Free	
	Low Solids	Low Solids	VOC-Free	VOC-Free
	No-Clean	No-Clean	No-Clean	No-Clean
Product #	951	965	970S	971
Percent Solids	2.0%	2.6%	2.7%	2.8%
Percent VOCs	792 g/liter or 98%	684 g/liter or 82%	0%	0%
Product Characteristics	This flux has extremely low solids, and is rosin-free. It is designed for foam applications. Practically no residues are left after the soldering process. This flux is suitable for computer, telecommunications, and other applications where reliability considerations are critical. Thinner 110 is recommended.	Low solids, foam- and spray-application flux. Designed for bare copper and multilayer boards (6 or more layers) when cleaning is not desired.	VOC-free, no-clean fluxes are water-based, water-soluble, halide-free, nonflammable, and eliminate the need for flux thinners. Designed for spray application.	This flux is designed for foam applications. It is VOC-free and halide-free. It exhibits better foaming action and has a lower solids content. 971 allows you to use deionized water as a thinner.
Compliant Specifications	ANSI-J-STD-004 Classification ORLO BELLCORE TR-NWT-000078 Issue 3 IPC-SF-818 Type L3CN QPL approved for MIL-F-14256-F Type LR-O	IPC-SF-818 Type L3CN BELLCORE TR-TSY-000078	IPC-SF-818 Type L3CN BELLCORE TR-TSY-000078	ANSI-J-STD-004 Classification ORLO BELLCORE TR-NWT-000078 Issue 3
Washable	YES	YES	YES	YES
With Water (If Desired)	Wash with hot DI water at 140°F to 160 °F or use 1% solution of KESTER BIO-KLEEN saponifier in water.	Water wash with KESTER BIO-KLEEN saponifier at 2% concentration.	DI water at 140 °F to 160 °F or 1% solution of KESTER BIO-KLEEN saponifier in water.	DI water at 140 °F to 160 °F or use 1% solution of KESTER BIO-KLEEN saponifier in water.

P/N	Description	Each Gal
951-GAL	Foaming flux, 4 gal per carton	\$21.85
965-GAL	No-clean flux, 4 gal per carton	22.30
970S-GAL	VOC-free, no-clean flux, 4 gal per carton	35.60
971-GAL	VOC-free, no-clean flux, 4 gal per carton	36.00

NOTE: Single gallons come standard in a carton of four. Also available in 1-gal packs and 5- and 53- gallon containers.

VOC-free no-clean fluxes eliminate:

- Toxic vapors of degreaser solvents
- Volatile organic compounds (VOCs)
- Ozone-depleting chlorofluorocarbon solvents (CFCs)
- Distillation expenses
- Flux thinners (VOCs)
- Evaporated solvents from flux residue cleanup (VOCs)
- Evaporation of solvents during soldering (VOCs)
- Hazardous-waste disposal
- Water-treatment expenses

## KESTER Rosin-Residue Removers

Removing rosin- or resin-flux residues has traditionally been accomplished with CFC (chlorofluorocarbon) solvents blended with alcohols. Some solvent blends also contained chlorinated solvents to increase the solvency strength. The increasing scientific evidence which indicates that CFC solvents are depleting the protective ozone layer in the stratosphere has resulted in an anticipated banning of CFC solvents. Removing rosin- or resin-flux residues, however, can be accomplished without using CFC solvents.



AP20

5240

5315

5768

### KESTER AP20 Rosin-Residue Remover

This is a blend of electronics-grade organic solvents used to dissolve and remove all types of rosin-flux residues from soldered connections. It is a clear, colorless, nonionic, and relatively non-toxic liquid with a mild "fruity" scent.

### KESTER Formula 5240

This product is for use in automatic soldering machines incorporating in-line cleaning equipment. The low-evaporation rate, rapid solvent action, and ease of reclamation, by distillation, makes it very economical to use. Does not contain CFCs.

### KESTER Formula 5315

KESTER 5315 is a solvent blend designed for use as a cleaner for automated-conveyor fingers in soldering machines. It is specifically developed for the removal of built-up residues from low-solids "no-clean" fluxes. Continuous use of 5315 prevents excessive flux residues from contaminating the conveyor and transferring to the circuit-board assembly. This solvent cleaner is more effective than isopropyl alcohol and other commonly used solvents. Does not contain CFCs.

P/N	Description	Each Gal
5315-GAL	Solvent-blended residue remover, 4 gal per carton	\$17.85

NOTE: KESTER chemicals in single gallons are sold in cartons of 3 or 4. Also available in 1-gal packs and 5- and 53-gallon containers.

### KESTER 5768 BIO-KLEEN Rosin-Residue Remover

This is a highly-concentrated liquid cleaner that is added to water to make a nonfoaming solution for removing rosin-flux residue. The alkaline chemicals in this cleaner react with rosin by a chemical conversion known as saponification to form soaps which are water-soluble. The resulting rosin soap and any water-soluble residue can be rinsed away with water. Thus, KESTER BIO-KLEEN eliminates the need for expensive, toxic, and environmentally-harmful chlorinated and fluorinated hydrocarbon solvents—traditionally used for flux removal.

P/N	Description	Each Gal
5768-GAL	BIO-KLEEN rosin-residue remover, 4 gal per carton	\$34.30

P/N	Description	Each Gal
AP20-GAL	Rosin-residue remover, 3 gal per carton	\$27.15

P/N	Description	Each Gal
5240-GAL	Rosin-residue remover, 3 gal per carton	\$32.00



**KESTER Thinner**

To select a thinner, find the flux you are using from the chart below.

Thinner	Flux	Thinner/Gal
108-GAL	145	\$15.45
109-GAL	185	15.85
120-GAL	186, 186-18	15.45
110-GAL	951	17.85
DI water	970S, 971, HF1189, HF1189A	N/A
104-GAL	1544, 1544-MIL	21.30
103-GAL	1585, 1585-MIL, 1587, 1587-MIL	19.85
4662-GAL	2224-25, 2331, 2331-ZX, 2235	15.15

NOTE: Single gallons come standard in a carton of 4. Also available in single-gallon pack, and 5- and 53-gallon containers.

**KESTER FLUX PEN™**

A unique tool for rework and touch-up soldering. It allows for controlled application of flux.



P/N	Description	Each
951-FLUX-PEN	Low solids, no-clean	\$3.80
186-FLUX-PEN	RMA, no-clean	3.80
2331-ZX-FLUX-PEN	Neutral pH, water-soluble	3.80
HF-1189-FLUX-PEN	VOC-free, organic, water-soluble	5.65
450-B-FLUX-PEN	Water-soluble rework flux	3.80
FLUX-PEN-Tips	Replacement tips	.25

**EASY BRAID FLUXTESTER™  
Flux-Test Kit**

These kits contain all components needed to evaluate the reliability of no-clean and water-soluble fluxes.

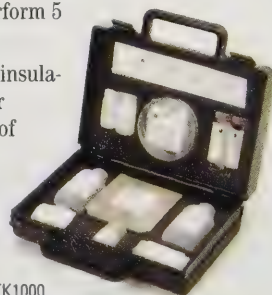
**Starter Flux-Test Kit**

- Corrosion tests—utilizing copper coupons and/or copper mirror to evaluate the corrosion characteristics of no-clean fluxes
- Halide test—checks for bromides and chlorides in no-clean fluxes
- Surface-insulation-resistance test for evaluating and rating no-clean fluxes—utilizing the new IPC "J" Standard PCBs

**Deluxe Flux-Test Kit**

Contains sufficient quantities of components to perform 5 to 6 tests.

- Includes a surface-insulation-resistance meter
- Tests the integrity of electrical-insulation resistance on a printed IPC board after exposure to a selected flux



FTK1000

P/N	Description	Each
FTK1000	Starter flux-test kit	\$139.00
FTK2000	Deluxe flux-test kit with S.I.R. test meter	1165.00

**AAPER® Isopropyl Alcohol**

This alcohol is excellent for removing white mineral residues, fluxes, and light oils. It may also be used as a thinner for most fluxes.

P/N	Description	Each Gal
Alcohol-99%-gal	99% isopropyl alcohol	\$9.50

NOTE: Sold in cartons of 4 gal.

**CHEMTRONICS FLUX-OFF®  
No-Clean Flux Remover**

CHEMTRONICS's nonflammable, CFC-free, flux remover for cleaning no-clean flux.

- Contains HCFCs • Dries fast • Leaves no residue • Removes encrusted flux
- Test before using on plastics • Liquid may be used in bench-top dispensers

NOTE: The liquid form of this product must be used in accordance with EPA regulations: May be used for hand-wiping applications.



ES1692

P/N	Description	Carton Qty.	Each
ES1692	14.5 oz, aerosol	12	\$12.50
ES892B	5 oz, BRUSHCLEAN system	12	6.75

NOTE: Also available in 1-gal and 55-gal containers.

**CHEMTRONICS FLUX-OFF®  
Water-Soluble Flux Remover**

This is a plastic-safe flammable flux remover for cleaning water-soluble flux.

- CFC/HCFC-free • Dries fast • Leaves no residue • Safe on water-sensitive components
- Liquid may be used in cold-dipping and rinsing applications, and in bench-top dispensers



ES1530

P/N	Description	Carton Qty.	Each
ES1530	13.5 oz, aerosol	12	\$9.30
ES830B	6 oz, BRUSHCLEAN™ system	12	6.75
ES1530CB	11-oz refill, CHEMBRUSH™ system	12	9.95
ES1630T	16 fl. oz, trigger spray	6	9.75
ESP30	0.33 fl. oz, pen	N/A	4.55
ES130	1 gal, liquid	N/A	49.45
ES530	5 gal, liquid	N/A	206.00

**CHEMTRONICS FLUX-OFF  
Rosin and Flux Remover**

This plastic-safe, flammable flux remover is for cleaning rosin and rosin-based no-clean fluxes.

- CFC/HCFC-free • Dries fast • Leaves no residue • Liquid may be used in cold-dipping and rinsing applications, and bench-top dispensers



ES1035

P/N	Description	Carton Qty.	Each
ES1035	10 oz, aerosol	12	\$10.65
ES835B	5 oz, BRUSHCLEAN system	12	6.20

**CHEMTRONICS FLUX-OFF®  
Heavy-Duty Flux Remover**

This flux remover is for removing encrusted no-clean and rosin fluxes from printed-circuit boards.

- Nonflammable • Ozone-safe, CFC/HCFC-free • Dries fast • Leaves no residue • Liquid may be used in ultrasonics, as a cold-immersion solvent, and in spray-dispensing systems



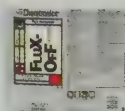
ES1631

P/N	Description	Carton Qty.	Each
ES1631	12 oz, aerosol	12	\$18.95
ES831B	5 oz, BRUSHCLEAN system	12	10.25

**CHEMTRONICS FLUX-OFF®  
Aqueous Flux Remover**

This flammable, plastic-safe, aqueous flux remover is for use in ultrasonics and in-line cleaners.

- CFC/HCFC-free • Cleans Type-R, RMA, RA, no-clean, and water-soluble fluxes
- Contains no silicates, abrasives, or caustics
- Engineered for removing flux from PC boards



ES132

P/N	Description	Each
ES132	FLUX-OFF, aqueous, 1 gal	\$24.15
ES532	FLUX-OFF, aqueous, 5 gal	90.00

**CHEMTRONICS FLUX-OFF CZ  
Flux Remover**

FLUX-OFF CZ is the first non-ozone-depleting, nonflammable, regular strength flux remover that is safe for use on plastics.

- The best CFC-113/CIROZANE™ CFC replacement formulated with HFE from 3M • Dries fast • Leaves no residue • Liquid may be used in ultrasonics, vapor degreasers, as a cold-immersion solvent, with spray-dispensing systems, or bench-top dispensers



ES7200

P/N	Description	Carton Qty.	Each
ES7200	12 oz, aerosol	12	\$25.60
ES7208B	5 oz, BRUSHCLEAN™ system	12	13.30

**CHEMTRONICS GOLD GUARD™ 2000**

This product removes oxides and other contaminants from precious metals and connectors without risk of abrasion. Lubricant causes no electrical resistance. It remains stable up to 200 °F.

- Protects, cleans, and lubricates in one application • Extends connector life
- Not for use in energized equipment



ES601

P/N	Description	Carton Qty.	Each
ES601	6 oz, aerosol	12	\$7.05
CP420E	GOLD GUARD 2000 pad, 50/box	N/A	29.20



**CHEMTRONICS POW-R-WASH™ NX Contact Cleaner**

This extra-strength, nonflammable contact cleaner quickly removes soils from metal-to-metal contacts.

- CFC-free, contains HCFCs • Dries fast • No residue • Test before using on plastics • Quickly removes oils, carbon soils, greases, and oxides from contact surfaces, electronic controls, and electrical panels

NOTE: The liquid form of this product must be used in accordance with EPA regulations.



ES1602

P/N	Description	Carton Qty.	Each
ES1602	14.5 oz, aerosol	12	\$12.50
ES2202	18 oz, aerosol	12	15.20

**CHEMTRONICS POW-R-WASH PR Contact Cleaner**

This is a regular-strength, nonflammable, CFC/HCFC-free contact cleaner that is safe for use on plastics.

- Dries fast • No residue • Removes oils, carbon soils, greases, and oxides from contact surfaces, electronic controls, and electrical panels



ES1605

P/N	Description	Carton Qty.	Each
ES1605	10 oz, aerosol	12	\$6.80

**CHEMTRONICS POW-R-WASH NR Contact Cleaner**

This is a regular-strength, nonflammable, CFC-free contact cleaner.

- Contains HCFCs • Dries fast • No residue • Test before using on plastics • Removes oils, carbon soils, greases, and oxides from contact surfaces, electronic controls, and electrical panels



ES1606

P/N	Description	Carton Qty.	Each
ES1606	12 oz, aerosol	12	\$9.10

**CHEMTRONICS POW-R-WASH CZ**

This is the first regular-strength, non-ozone-depleting, nonflammable cleaner that is safe for use on powered-up contacts and surrounding plastics.

- CFC/HCFC-free • The best CFC-113 or CIROZANE™ CFC replacement formulated with HFE from 3M • Removes oils, greases, and oxides from contact surfaces • Dries fast • No residue



ES7300

P/N	Description	Carton Qty.	Each
ES7300	10 oz, aerosol	12	\$25.00
ES7308	5 oz, aerosol	12	11.95
ES7301	1 gal, liquid	N/A	315.00

NOTE: Also available in 5-gal and 55-gal containers.

**CHEMTRONICS POW-R-WASH PN**

This nonflammable, CFC-free cleaner is safe for use on powered-up, contacts and surrounding plastics.

- Contains HCFCs • Dries fast • No residue • Quickly removes oils, greases, and oxides



ES1674

P/N	Description	Carton Qty.	Each
ES1674	12 oz, aerosol	12	\$17.35

**CHEMTRONICS ELECTRO-WASH PX Universal Cleaner**

An extra-strength, nonflammable, CFC/HCFC-free universal cleaner that is safe for use on plastics. The liquid may be used in cold dipping and rinsing applications.

- Extra cleaning strength • Dries fast • No residue • Removes organic and ionic soils



ES1210

P/N	Description	Carton Qty.	Each
ES1210	12.5 oz, aerosol	12	\$12.25
ES810B	5 oz, BRUSHCLEAN system	12	7.00
ES110	1 gal, liquid	N/A	37.45

NOTE: Also available in 5- and 55-gal containers.

**CHEMTRONICS ELECTRO-WASH NX Cleaner/Degreaser**

This is CHEMTRONICS's extra-strength, nonflammable, fast-drying CFC-free cleaner/degreaser.

- Cleans encrusted hard-to-remove soils • Contains HCFCs • No residue • Quickly removes oils, greases, oxides, and handling soils

NOTE: The liquid form of this product must be used in accordance with EPA regulations.



ES1601

P/N	Description	Carton Qty.	Each
ES1601	14.5 oz, aerosol	12	\$12.10
ES2201	18 oz, aerosol	12	14.85

**CHEMTRONICS ELECTRO-WASH CZ Cleaner/Degreaser**

The first nonozone-depleting, nonflammable cleaner/degreaser that is safe for use on plastics.

- Regular cleaning strength • CFC/HCFC-free • The best CFC-113 or CIROZANE™ CFC replacement formulated with HFE from 3M • Quickly removes oils, greases, oxides, and handling soils • Dries fast • No residue



ES7100

P/N	Description	Carton Qty.	Each
ES7100	12 oz, aerosol	12	\$24.15
ES7108B	5 oz, BRUSHCLEAN system	12	12.85

NOTE: Also available in 1-gal, 5-gal, and 55-gal containers.

**CHEMTRONICS ELECTRO-WASH PN Cleaner/Degreaser**

This nonflammable, CFC-free cleaner/degreaser is safe for use on plastics. The liquid can be used in ultrasonics, vapor degreasers, as a cold-immersion solvent, or with spray-dispensing systems.

- Contains HCFCs • Dries fast • No residue • Quickly removes oils, greases, oxides, and handling soils



ES1675

P/N	Description	Carton Qty.	Each
ES1675	12 oz, aerosol	12	\$15.75

**CHEMTRONICS ELECTRO-WASH PR Cleaner/Degreaser**

This regular-strength, CFC/HCFC-free cleaner/degreaser is safe for use on plastics.

- Flammable • Upper-ozone-safe • Dries fast • No residue



ES1603

P/N	Description	Carton Qty.	Each
ES1603	10 oz, aerosol	12	\$6.70

**CHEMTRONICS ELECTRO-WASH NR Cleaner/Degreaser**

This is CHEMTRONICS's regular-strength, nonflammable, CFC-free cleaner/degreaser.

- Contains HCFCs • Dries fast • No residue • Test before using on plastics • Quickly removes oils, greases, oxides, and handling soils



ES1604

P/N	Description	Carton Qty.	Each
ES1604	12 oz, aerosol	12	\$8.50

**CHEMTRONICS ELECTRO-WASH Two-Step Cleaner**

This is an extra-strength, nonflammable, CFC/HCFC-free ultrasonic and immersion cleaner.

- Cleans solder pastes and inks from screens and stencils
- Removes conformal coatings, oils, greases, oxides, and handling soils • Use ELECTRO-WASH CZ, PX, or PR for rinsing
- High flash point enables use with a wide range of temperatures



ES125A

P/N	Description	Each
ES125A	ELECTRO-WASH two-step, 1 gal	\$71.55

NOTE: Also available in 5-gal and 55-gal containers.

**Most CHEMTRONICS aerosols spray in any direction, even upside down.**



## From the bench

### The CFC Story

Courtesy of  
Tech Spray

The electronics industry grew up using CFC-113 and 1,1,1-trichloroethylene, which can no longer be produced. The following guide provides a list of alternatives and some information about each.

	CFC-113	Ecoline	HCFC-14th	ASAHIKLIN AK225	VERTREL® SMT	IIFE-7100	N-Propyl Bromide
<b>Producer</b>	Many	Many	Many	AGA Chemicals	DuPont	3M	3
<b>U.S. Price/lb</b>	\$10.00	\$2.00	\$3.00	\$14.15	\$15.15	\$18.00	TBA*
<b>ODP</b>	0.80	None	0.11	0.03	None	None	0.002-0.03
<b>VOC</b>	Exempt	Yes	Exempt	Exempt	Exempt	Yes**	Yes
<b>Boiling Point</b>	118 °F (48 °C)	Varies	90 °F (32 °C)	129 °F (54 °C)	99 °F (37 °C)	140 °F (60 °C)	160 °F (71 °C)
<b>Toxicity (TLV)</b>	1,000 ppm	50-500 ppm	500 ppm	50 ppm	200 ppm	600 ppm	100 ppm
<b>Flammable</b>	No	Yes	No	No	No	No	No
<b>Safe on Plastics</b>	Yes	Yes	No	Yes	Yes	Yes	No
<b>Rapidly Evaporating</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Cleaning Ability</b>	Excellent	Good	Excellent	Excellent	Fair	Fair	Excellent

\*To be announced.

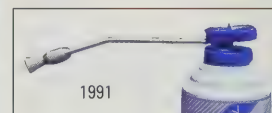
\*\*IIFE will be an exempt VOC. However, the EPA has not yet granted the exemption.

### TECH SPRAY ENVI-RO-TECH™ HCFC Solvents

The ENVI-RO-TECH cleaners can be used in aerosol, wiping, and bench-top applications. This group of solvents is nonflammable with excellent cleaning ability and rapid evaporation.

The heavy-duty cleaner/degreaser is used to penetrate and dissolve nonpolar soils such as oil, grease, wax, tar, adhesive, and rosin. The defluxer is effective against RA-, RMA-, and SA-type fluxes. The universal cleaner is a fast-acting and highly effective cleaner.

P/N	Description	Carton Qty.	Each
1675-12S	Heavy-duty cleaner/degreaser, 12 oz, aerosol	24	\$9.85
1675-22S	Heavy-duty cleaner/degreaser, 22 oz, aerosol	12	13.80
1676-12S	General-duty defluxer, 12 oz, aerosol	24	9.10
1676-22S	General-duty defluxer, 22 oz, aerosol	12	13.30
1677-12S	Universal cleaner, 12 oz, aerosol	24	8.90
1677-22S	Universal cleaner, 22 oz, aerosol	12	13.95
1991	Brush attachment for ENVI-RO-TECH Series	6	14.95



1677-22S

### TECH SPRAY ENVI-RO-TECH™ 1679 General De-fluxer/Cleaner

The 1679 is an alcohol-based general-duty de-fluxer for RA, RMA, and SA fluxes. It can also be used as an all-purpose cleaner to remove contaminants found in electronics manufacturing.

- No CFCs, no HCFCs, no HFCs • Mild cleaner
- Removes ionic contamination • General defluxer
- Noncorrosive • Zero residue



1679-PT

### TECH SPRAY BLUE SHOWER® II 1667

Modeled after TECH SPRAY's popular BLUE SHOWER 1657, BLUE SHOWER II is for general cleaning and degreasing. Nonflammable and safe on plastics, BLUE SHOWER II sets the standard for precision cleaning of polar and nonpolar soils, including hand oils, solder oils, greases, silicones, fluxes, and similar soils.

- For use in aerospace and on electronic and electrical equipment, electromechanical assemblies, contacts, switches, relays, and solenoids
- Blended HCFC-225
- Low ODP • Excellent solvent for most soils
- Excellent penetration
- Leaves no residue
- EPA-listed



1667-18S

1667-8S

### TECH SPRAY ECOLINE Solvents

ECOLINE's cleaner/degreaser is designed for basic cleaning jobs. The flux remover is a specially-formulated blend that excels in bench-top flux removal. The contact cleaner works well on electrical contacts, and the tape-head cleaner removes tape residues and other contaminants from magnetic and optical tape-heads. The dusting gas is hydrocarbon based and offers the same convenience as more expensive HFC dusters.



1622-10S

1623-8S

1620-10S

1621-10S

1624-10S

P/N	Description	Each
1679-PT	1 pt, antistatic plastic trigger bottle	\$9.20

**Aerosols are available in 3-packs.  
Call for more information.**

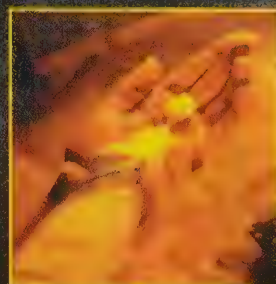
P/N	Description	Carton Qty.	Each
1667-3S	3-oz aerosol	12	\$6.85
1667-8S	8-oz aerosol	12	11.45
1667-18S	18-oz aerosol	12	21.50
1667-Q	1 qt in glass	N/A	77.50

P/N	Description	Carton Qty.	Each
1620-10S	Cleaner/degreaser, 10 oz, aerosol	24	\$7.80
1621-10S	Flux remover, 10 oz, aerosol	24	7.95
1622-10S	Contact cleaner, 10 oz, aerosol	24	7.45
1623-8S	Dust remover, 8 oz, aerosol	24	6.50
1624-10S	Tape-head cleaner, 10 oz, aerosol	24	7.40



# TECH SPRAY'S APPLICATION GUIDE

## BENCHTOP PRODUCTS



## PRODUCTION PRODUCTS



## CLEANERS/DEFLUXERS

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## TECH SPRAY AK225 Solvents

TECH SPRAY offers a group of solvents, based on AK225, that come closer to being direct replacements for CFC-113 than do any other solvents. This group of solvents is nonflammable and has excellent solvency. They can be used in all areas where CFC-113 would have been used including: vapor degreasing, bench-top cleaning, and aerosol applications.

The AK225 NEAT solvent is excellent for metal degreasing. ATMS ozeotropic-blend solvent, using transdichloro-ethylene and methanol, is an ideal 1,1,1-trichloroethylene replacement. And the AMS solvent, a mixture of AK225 and methanol, is designed for defluxing via vapor degreasing or cold-batch cleaning. It offers superior flux removal for Type R, RMA, RA, and synthetic fluxes.

- Nonflammable • Rapid evaporation • Low ODP



P/N	Description	Carton Qty.	Each
1663-3S	AK225 NEAT, 3 oz, aerosol	12	\$6.85
1663-8S	AK225 NEAT, 8 oz, aerosol	12	12.70
1663-18S	AK225 NEAT, 18 oz, aerosol	12	24.15
1663-Q	AK225 NEAT, 1 qt, glass container	1	82.40
1663-G	AK225 NEAT, 1 gal, glass container	1	247.60
1664-3S	ATMS, 3 oz, aerosol	12	7.15
1664-8S	ATMS, 8 oz, aerosol	12	11.75
1664-18S	ATMS, 18 oz, aerosol	12	21.20
1664-Q	ATMS, 1 qt, glass container	1	75.50
1664-G	ATMS, 1 gal, glass container	1	207.40
1665-3S	AMS, 3 oz, aerosol	12	6.85
1665-8S	AMS, 8 oz, aerosol	12	12.05
1665-18S	AMS, 18 oz, aerosol	12	22.65
1665-Q	AMS, 1 qt, glass container	1	82.95
1665-G	AMS, 1 gal, glass container	1	229.50

## TECH SPRAY HFE Cleaner/Degreaser

This cleaner/degreaser is a non-ozone-depleting, nonflammable, rapidly evaporating solvent with excellent plastic compatibility. It is a precision solvent designed to remove dirt, oil, grease, and other stubborn contaminants.



1685-8S

P/N	Description	Carton Qty.	Each
1685-3S	3-oz aerosol	12	\$10.00
1685-8S	8-oz aerosol	12	18.60
1685-G	1 gal in glass	1	300.65

NOTE: Also available in 5-gal and 54-gal sizes.

## TECH SPRAY HFE Flux Remover

- Designed for high-end flux removal
- Non-ozone depleting, nonflammable, safe on plastics, and makes an excellent cleaner for hand and batch bench-top cleaning applications
- Readily removes Type R, RMA, RA, and synthetic fluxes from printed-circuit assemblies
- Efficient 1-step defluxer



1686-8S

P/N	Description	Carton Qty.	Each
1686-3S	3-oz aerosol	12	\$10.15
1686-8S	8-oz aerosol	12	19.15
1686-G	1 gal in glass	1	314.40

NOTE: Also available in 5-gal and 54-gal sizes.

## TECH SPRAY HFE Contact Cleaner

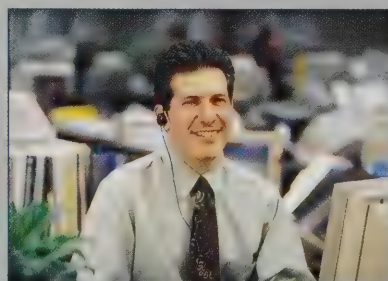
This solvent is designed to clean electrical contacts and switches. It is non-ozone depleting, nonflammable, rapidly evaporating, safe on plastics, and can be used for either hand or batch cleaning, to remove oil, grease, silicone, dirt, and grime from contacts and pads.



1687-8S

P/N	Description	Carton Qty.	Each
1687-3S	3-oz aerosol	12	\$10.00
1687-8S	8-oz aerosol	12	18.60
1687-G	1 gal in glass	1	300.65

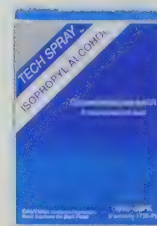
NOTE: Also available in 5-gal and 54-gal sizes.



Need Help? Just Call.

## TECH SPRAY Isopropyl Alcohol

- 99%-pure anhydrous alcohol for all-purpose cleaning
- Excellent for tape-head cleaning and removal of fluxes, light oils, polar soils, and white-mineral residue
- Can be used as a thinner for most fluxes
- Rapid evaporation
- Nonaggressive



1610-50PK

P/N	Description	Carton Qty.	Each
1610-50PK	50 pre-saturated packets per carton	1	\$14.60
1610-P	1 pt in shatterproof glass	2	6.75
1610-G	1 gal in metal container	1	31.95
1610-DSP	Pre-saturated wipes in pop-up container	12	10.60

## TECH SPRAY ENVI-RO-TECH™ 1672 Freeze Spray

This product contains no CFCs (contains HFCs). It's a rapidly-evaporating liquid that chills to -62 °F and is used as a troubleshooting aid for intermittently faulting capacitors, resistors, semi-conductors, and other defective components. It also detects cold solder joints, cracks in printed-circuit boards, and oxidized junctions.



1672-10S

- Zero ozone-depletion potential
- Nonflammable
- Leaves no residue
- Rapid evaporation
- Non-conductive

P/N	Description	Carton Qty.	Each
1672-10S	Freeze Spray, 10 oz	12	\$5.65

## TECH SPRAY ENVI-RO-TECH 1747 Antistatic Freezer

This product is used as a troubleshooting aid in static-sensitive areas for faulty components. It also detects cold solder joints and oxidized junctions.

- 100% HFC-134A
- No CFCs, no HCFCs
- Leaves no residue
- Non-flammable
- Rapid evaporation
- Static control



1747-10S

P/N	Description	Carton Qty.	Each
1747-10S	Antistatic freezer, 10 oz	12	\$5.40

**Most aerosols also available in 3-packs. Call for more information.**



We are a full-service distributor with a broad range of the best products.



## CHEMTRONICS FREEZ-IT®, FREEZ-IT ANTISTAT®, and Freeze Spray

### FREEZ-IT and FREEZ-IT ANTISTAT

FREEZ-IT is a high-performance, pinpoint-accurate freeze spray for isolating individual components on PC boards. The antistatic version safely cools individual static-sensitive components.

- Safe on plastics • Nonflammable
- Extra cleaning strength • Upper-ozone-safe, HFC/HCFC-free • Pin-point spray isolates individual components without freezing surrounding areas

Applications: • Locate thermal intermittents on PC boards • Assure trace continuity when PC boards are subjected to stress • Provide heat-sink protection for heat-sensitive components during soldering and desoldering



ES1050

P/N	Description	Carton Qty.	Each
ES1050	FREEZ-IT, 10 oz, aerosol	12	\$9.25
ES1550	FREEZ-IT, 15 oz, aerosol	12	13.25
ES1051	FREEZ-IT ANTISTAT, 10 oz, aerosol	12	9.45
ES1551	FREEZ-IT ANTISTAT, 15 oz, aerosol	12	13.40

### Freeze Spray

This is an economical, general-purpose freeze spray with a wide spray for cooling entire PC boards.

- Safe on plastics • Nonflammable • Upper-ozone-safe, CFC/HCFC-free

P/N	Description	Carton Qty.	Each
ES1052	Freeze spray, 10 oz, aerosol	12	\$6.60

## CHEMTRONICS ULTRAJET Duster

This nonflammable duster penetrates hard-to-reach areas and won't scratch delicate surfaces. Use ULTRAJET duster for precise cleaning of electronic components and equipment, including PCBs, surface-mount devices, computers, and business machines.

- Biggest blast of any non-CO<sub>2</sub> duster • 100% HFC-134a—leaves no residue



ES1020

P/N	Description	Carton Qty.	Each
ES520	ULTRAJET duster, 5 oz	24	\$5.50
ES1020	ULTRAJET duster, 10 oz	12	8.95

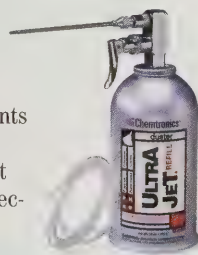
## CHEMTRONICS ULTRAJET® Duster System

This is a reusable duster system with a precision surgical-grade chrome trigger valve.

- Safe on plastics • Nonflammable • Regular cleaning strength • Ozone-safe, CFC/HCFC-free
- 100% ultrapure HFC-134a—leaves no residue
- Reusable chrome-trigger and extension-tube system fits refill cans, saves money • Sprays in any direction with 36" flexible extension tube (attachment) • Removes dust, dirt, and other dry contaminants

Applications include:

- PC boards • Computers
- Keyboards • Audio equipment • Laboratory instruments
- Medical devices • Photographic and video equipment
- TV and VCR internals • Electronics instruments • PLCs
- Contacts and connectors



ES1020R

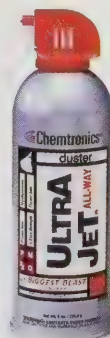
P/N	Description	Carton Qty.	Each
ES1020K	10 oz, aerosol kit	12	\$25.80
ES1020R	10 oz, aerosol refill	12	8.85
ES710V	Chrome trigger valve	N/A	20.85

## CHEMTRONICS ULTRAJET® All-Way Duster

The duster that sprays in any direction with the biggest blast to clean anything fast.

- Safe on plastics • Nonflammable • Extra cleaning strength • Ozone-safe, CFC/HCFC-free
- 100% ultrapure HFC-134a—leaves no residue
- Can be sprayed in any direction without the risk of dispensing a liquid spray that can freeze or damage sensitive surfaces • Removes dust, dirt, and other dry contaminants

Applications include: • PC boards • Computers • Keyboards • Audio equipment • Laboratory instruments • Medical devices • Photographic and video equipment • TV and VCR internals • Electronics instruments • PLCs • Contacts and connectors



ES1620

P/N	Description	Carton Qty.	Each
ES1620	8 oz, aerosol	12	\$8.95

## CHEMTRONICS ULTRAJET 70 Duster

- A powerful economical duster with a bigger blast than all competitive dusters



ES1015

P/N	Description	Carton Qty.	Each
ES1015	ULTRAJET 70 duster, 10 oz	12	\$6.60

## CHEMTRONICS Duster

This is CHEMTRONICS's economical, regular-strength duster.

- Safe on plastics • Nonflammable • Regular cleaning strength • Ozone-safe, CFC/HCFC-free
- Made with HFC-134a • Removes dust, dirt, and other dry contaminants

Applications include: • PC boards • Computers • Keyboards • Audio equipment • Laboratory instruments • Medical devices • Photographic and video equipment • TV and VCR internals • Electronics instruments • PLCs • Contacts and connectors



ES1217

P/N	Description	Carton Qty.	Each
ES1217	8 oz, aerosol	12	\$4.90
ES1617	12 oz, aerosol	12	7.35

## CHEMTRONICS ULTRAJET® CO<sub>2</sub> Duster

Formulated of ultra-pure CO<sub>2</sub> gas, this unique precision duster is noncorrosive and will not spot. It's particularly suited for fiber optics, keyboards, photo equipment, and other sensitive equipment. The reusable system includes a precision valve assembly, restricted-tip nozzle, pen-tip nozzle, 36" extension hose, and 2.4 oz refill cylinder.

- High-pressure (300 psi)



ES270-1

P/N	Description	Carton Qty.	Each
ES270-1	ULTRAJET System	1	\$95.35
ES275	2.4-oz refill cylinder	24	13.25

## TECH SPRAY ENVI-RO-TECH 1671 Duster

This product contains no CFCs (contains HFCs). Exceptionally pure, moisture-free inert gas is expelled at a high velocity to remove particulates without the use of harmful solvents.

- Nonflammable • Leaves no residue
- Quad filtered, inert • Moisture free
- Nonabrasive



1671-10S

P/N	Description	Carton Qty.	Each
1671-10S	CFC-Free Duster, 10 oz	12	\$5.25
1990	Spray Attachment	6	8.95
1671-10RS	Envi-Ro-Tech Duster refill	12	5.55



New Product: This symbol represents the industry's latest offerings.



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We're Here  
to Help.



# CHEMTRONICS KONFORM®

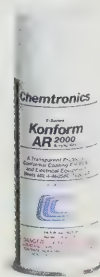
Newly reformulated conformal coatings provide superior performance with no ozone-depleting compounds.

- Superior protection against moisture, salt, fungus, corrosive vapors, and other adverse elements
- Excellent thermal properties that withstand hot and cold operating environments as well as heat generated by electronic circuitry
- High dielectric strength provides maximum performance
- UV indicator for improved quality assurance

## CHEMTRONICS KONFORM AR® 2000

Strong, high-dielectric, acrylic resin provides effective insulation against high-voltage arcing and corona shorts.

- Acrylic coating
- Meets MIL-I-46058C, Type AR
- Usable temperature range from -75 °F to 279 °F
- UL Recognized



CTAR-12

P/N	Description	Carton Qty.	Each
CTAR-12	KONFORM AR 2000, 11.5 oz	12	\$13.20
CTAR-1	KONFORM AR 2000, 1 gal	1	121.00

Also available in 5- and 55-gallon sizes

## CHEMTRONICS KONFORM UR® 2000

A high tensile strength urethane coating that offers high dielectric properties and strong resistance to chemicals.

- Urethane coating
- Meets MIL-I-46058C, Type UR
- Usable temperature range from -49 °F to 230 °F
- UL Recognized

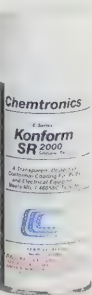
P/N	Description	Carton Qty.	Each
CTUR-1	KONFORM UR 2000, 1 gal	1	\$139.15

Also available in 5- and 55-gallon sizes

## CHEMTRONICS KONFORM SR® 2000

This is the ideal coating for electronics applications that involve extreme temperatures. KONFORM SR2000 provides the highest flexibility and long-term protection in adverse operating conditions.

- Silicone coating
- Meets MIL-I-46058C, Type SR
- Usable temperature range from -85 °F to 390 °F
- UL Recognized



CTSR-12

P/N	Description	Carton Qty.	Each
CTSR-12	KONFORM SR 2000, 10 oz	12	\$15.90
CTSR-1	KONFORM SR 2000, 1 gal	1	145.20

Also available in 5- and 55-gallon sizes

## TECH SPRAY FINE-L-KOTE™ Conformal Coatings

This full line of conformal coatings is designed to meet the variety of production-line and individual application needs of today's industry. Each coating is formulated for a unique application with critical attention given to the various environmental stressors that it must protect against.

FINE-L-KOTE SR is a silicone-resin conformal coating that is durable enough to stand up to harsh environments. FINE-L-KOTE AR is an acrylic conformal coating that provides insulation against high-voltage arcing and corona shorts. FINE-L-KOTE UR is a urethane conformal coating that is clear, repairable, and has superior dielectric properties.

- No CFCs
- Resist fungus
- Durable



2102-12S

P/N	Description	Each
2102-12S	FINE-L-KOTE SR, 12 oz, aerosol	\$15.40
2103-12S	FINE-L-KOTE AR, 12 oz, aerosol	13.05
2104-12S	FINE-L-KOTE UR, 12 oz, aerosol	14.20

## LOCTITE SHADOWCURE™ 18893

SHADOWCURE is a Type-AR aerosol conformal coating spray. It air-dries tack-free in 5 min. It completely cures in 24 hours to a tough, durable coating that protects and prolongs the life of rigid printed circuit boards.

- Fast-drying
- Clear
- Temperature range: -40 °C to +125 °C
- High dielectric strength
- No CFCs



18893

P/N	Description	Carton Qty.	Each
18893	SHADOWCURE Type-AR aerosol conformal coating, 12-oz can	12	\$9.20

## JNJ INDUSTRIES Solder-Paste and Flux Remover

This product is an excellent defluxer for R-, RA-, and RMA-type fluxes, and is good for cleaning boards, contacts, relays, gold fingers, and most types of electronic assemblies. It is an aggressive water-soluble cleaner and a very good general-purpose degreaser that can be used in a dip or ultrasonic tank.

- Completely water-soluble
- Nonflammable
- Removes grease and oils
- Quick-drying
- High flash point



SW100PFR SW50PFR GA6PFR SB6PFR

P/N	Description	Each
SW50PFR	Canister with 50 SUPERSATURATED SMARTWIPES	\$13.50
SW100PFR	Canister with 100 SUPERSATURATED SMARTWIPES	19.75
SB6PFR	1-pt trigger SMARTSPRAY bottle (antistatic plastic)	10.75
GA6PFR	1-gal container	29.20

## JNJ INDUSTRIES Semiaqueous Paste and Flux Remover

This is an ideal product for cleaning water-soluble and rosin-based fluxes, and for general degreasing applications. It works quickly to remove tough organic contaminants such as soldering oils, waxes, and other similar soils that are found in electronics assembly manufacturing; it is excellent for cleaning printing screens and stencils; and it does not require a rinse.

- Nonflammable
- Noncorrosive
- Very low odor
- Completely water-soluble
- Low-cost
- No phosphates
- No saponifiers



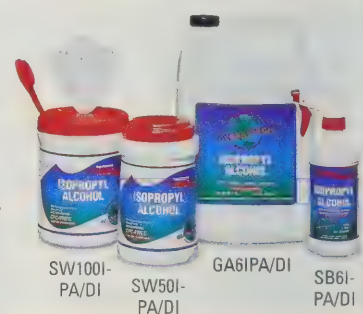
SW100AFR SW50AFR GA6AFR SB6AFR

P/N	Description	Each
SW50AFR	Canister with 50 SUPERSATURATED SMARTWIPES	\$13.00
SW100AFR	Canister with 100 SUPERSATURATED SMARTWIPES	19.75
SB6AFR	1-pt trigger SMARTSPRAY bottle (antistatic plastic)	10.75
GA6AFR	1-gal container	29.15

## JNJ INDUSTRIES Isopropyl Alcohol with Deionized Water

This universal cleaner and disinfectant is good for the removal of most types of inks, pastes, light oils, and contaminants associated with soldering, fluxing, printing, and most industrial cleaning applications. It is also available in a 99%-pure isopropyl electronics- and clean-room-grade solution.

- Very fast evaporator
- Non-aggressive
- General-purpose cleaner
- Low odor



SW100IPA/DI SW50IPA/DI GA6IPA/DI SB6IPA/DI

P/N	Description	Each
SW50IPA/DI	Canister with 50 SUPER SATURATED SMARTWIPES®	\$10.75
SW100IPA/DI	Canister with 100 SUPER SATURATED SMARTWIPES	15.75
SB6IPA/DI	1-pt trigger SMARTSPRAY™ bottle (antistatic plastic)	6.50
GA6IPA/DI	1-gal container	12.50

**Aerosols Are Available in 3-Packs.  
Call for More Information.**



We are a full-service distributor with a broad range of the best products.



## TECH SPRAY WONDERMASK® P

WONDERMASK P is a temporary peelable solder mask comprised of a thixotropic, synthetic acrylic latex designed to withstand fluxing, wave-soldering, and cleaning operations. Unlike a natural latex mask, WONDERMASK P contains no offensive ammonia and hence, is noncorrosive to copper, gold, silver, or pre-soldered surfaces—will not stain substrates. This product may be used in most common forms of mask applications such as robotic, pneumatic, hand-applied, or template screening (not recommended for silk screening).

- Cure indicator • Antistatic
- Stable formulation • Versatile



2211-8SQ

P/N	Description	Carton Qty.	Each
2211-30CC	30 cc-syringe	6	\$7.05
2211-8SQ	8 oz, antistatic squeeze bottle	24	7.40
2211-G	1 gal in plastic	1	60.00

## TECH SPRAY WONDERMASK PL Latex

WONDERMASK PL latex is a temporary, peelable solder mask comprised of a thixotropic, natural acrylic latex. It is designed to withstand fluxing, wave soldering, and cleaning operations.

- Rapid drying • Excellent peel strength • Versatile
- Slip-resistant • Works in low humidity



2218-8SQ

P/N	Description	Carton Qty.	Each
2218-30CC	30-cc syringe	6	\$5.45
2218-8SQ	8 oz, antistatic squeeze bottle	24	6.95

NOTE: Also available in 1-gal container.

## TECH SPRAY WONDERMASK W

This temporary, water-soluble, solder-masking agent is formulated with noncontaminating, non-corrosive materials. WONDERMASK W is compatible with all organic and synthetic fluxes and is quickly removed in batch-cleaning and in-line water systems. This masking agent is available in 3 viscosities: WONDERMASK W is formulated for hand applications, WONDERMASK WA is for robotic- and pneumatic-dispensing equipment, and WONDERMASK WS is a thicker formulation designed for silk-screening and template screening operations.

- Water soluble • Noncontaminating
- Heat stable • Noncorrosive
- Nonflammable • Thixotropic



2205-8SQ

P/N	Description	Carton Qty.	Each
2205-30CC	30-cc syringe	6	\$7.05
2205-8SQ	8 oz, antistatic squeeze bottle	24	7.05
2205-G	1 gal in plastic	1	51.15

## CHEMTRONICS CHEMASK®

This is a fast-curing, peelable solder mask.

- Protects components from wave-soldering • Dries tack-free in 30 min
- Latex material is compatible with all flux systems • Stable to 515 °F (268 °C) • Leaves no residue when removed • Nonflammable, noncontaminating, no ionic or corrosive residue



CM8

P/N	Description	Each
CM8	8 oz, liquid, squeeze-bottle	\$8.80
CM1	1 gal, liquid	89.30

## CHEMTRONICS CHEMASK® W

This is a water-soluble temporary masking agent.

- Protects components from wave-soldering • UV indicator for positive quality control • Noncorrosive; safe for sensitive gold, silver, and copper contacts • High-temperature protection from molten solder to 515 °F (268 °C) • Easily removed in water-cleaning cycles

P/N	Description	Each
CW8	8 oz, liquid, squeeze-bottle	\$7.75
CW1	1 gal, liquid	79.05

## KESTER/TECHFORM™ TC-527 Latex Solder Mask

TC-527 is a high-temperature, flexible, solder-masking compound that is specially formulated of natural latex rubber. The latex is chemically enhanced so it is heat-stable and tacky enough to be applied to those areas of circuit boards that require masking during a wave-soldering process. This versatile product effectively masks and protects the board from the time it is manufactured through all assembly and flow operations. TC-527 can remain on the protected areas of the board until it is ready for testing, then it can be easily peeled away without leaving a residue.

- Prevents solder from flowing into contacts, terminals, screw heads, and plated through-holes
- Easily applied by automatic-dip, brush, or flow methods—direct from applicator bottle or by automated dispensing machines
- Withstands temperatures up to 500 °F—allowing sufficient time for flow-soldering operations



TC-527-PT TC-527-GAL TC-527-1/2-PT

P/N	Description	1-23	24-71	72+
TC-527-1/2-PT	Latex solder mask, 1/2 pt	\$12.25	\$7.00	\$6.40
TC-527-PT	Latex solder mask, 1 pt	20.10	11.50	10.50
P/N	Description	1-3	4-11	12+
TC-527-GAL	Latex solder mask, 1 gal	\$83.95	\$48.00	\$44.00

Note: Also available in 5-gal containers.

## KESTER/TECHFORM TC-530 De-Ammoniated Peelable Solder Mask

TC-530 is a peelable latex-based de-ammoniated solder mask, with low-odor characteristics, that does not tarnish copper. It is formulated for application to areas of printed-circuit boards which require masking during wave-soldering processes. It can be used on bare copper without causing oxidation. It can also be used as a mold seal and conformal-coating mask.



P/N	Description	1-23	24-71	72+
TC-530-1/2-PT	Mask, 1/2 pt	\$14.85	\$9.90	\$8.25
TC-530-PT	Mask, 1 pt	16.85	15.60	14.45
P/N	Description	1-3	4-11	12+
TC-530-GAL	Mask, 1 gal	\$142.65	\$95.10	\$88.75

## KESTER/TECHFORM TC-533 Hi-Temp Peelable Solder Mask

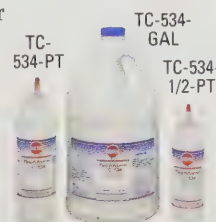
TC-533 is a high-temperature flexible solder-masking compound specially formulated of latex rubber. The latex is chemically enhanced so that it is heat stable and tacky enough to be applied to those areas of circuit boards which require masking during wave-soldering processes. It is extremely versatile as a temporary solder mask, conformal-coating maskant, and a potting-compound mold seal.



P/N	Description	1-23	24-71	72+
TC-533-1/2-PT	Mask, 1/2 pt	\$6.70	\$6.20	\$5.75
TC-533-PT	Mask, 1 pt	11.00	10.15	9.40
P/N	Description	1-3	4-11	12+
TC-533-GAL	Mask, 1 gal	\$45.50	\$42.00	\$39.00

## KESTER/TECHFORM TC-534 Latex Peelable Solder Mask

TC-534 is formulated primarily for use in conformal-coating applications where masks must be applied in thick layers over large components. This formulation cures more quickly than similar latex-based products. It is not recommended for use on bare copper.



P/N	Description	1-23	24-71	72+
TC-534-1/2-PT	Mask, 1/2 pt	\$7.45	\$6.90	\$6.40
TC-534-PT	Mask, 1 pt	12.45	11.50	10.65
P/N	Description	1-3	4-11	12+
TC-534-GAL	Mask, 1 gal	\$102.50	\$58.55	\$53.70



## KESTER/TECHFORM TC-560 High-Temperature Water-Soluble Mask

TC-560 is a liquid temporary solder mask specially formulated to protect circuit boards during wave-soldering operations. It is compatible with rosin fluxes and organic fluxes, but should not be used with inorganic acid fluxes. It may be removed with hot (170 °F–180 °F) water in any appropriate cleaning equipment.

*Not recommended for removal in closed-loop aqueous systems.*



P/N	Description	1-23	24-71	72+
TC-560-1/2-PT	Mask, 1/2 pt	\$14.80	\$8.50	\$7.75
TC-560-PT	Mask, 1 pt	21.90	12.50	11.50
P/N	Description	1-3	4-11	12+
TC-560-GAL	Mask, 1 gal	\$75.40	\$43.10	\$39.50

## KESTER/TECHFORM TC-563 Water-Soluble Screen- or Stencil-Printing Mask

Specifically designed as a printable water-soluble mask, TC-563 is more viscous than standard dispense-grade masks. It also allows for longer working life on the stencil. The TC-563 mask can be used with any type of flux.



P/N	Description	1-3	4-11	12+
TC-563-GAL	Temporary mask, 1 gal	\$136.15	\$125.65	\$50.30

## KESTER/TECHFORM TC-564-1 Water-Soluble Hi-Temp Temporary Solder Mask

TC-564-1 is specially designed to effectively protect solder-free areas on printed-circuit boards. It can be used with any type of flux and can be washed away with any appropriate cleaning equipment.



P/N	Description	1-23	24-71	72+
TC-564-1-1/2-PT	Mask, 1/2 pt	\$14.70	\$8.40	\$7.70
TC-564-1-PT	Mask, 1 pt	25.00	14.30	13.10
P/N	Description	1-3	4-11	12+
TC-564-1-GAL	Mask, 1 gal	\$124.25	\$71.00	\$65.10

## KESTER/TECHFORM TC-580 Screen-Print, Heat-Cure Solder Mask

TC-580 is plastisol-based and does not dry at room temperature, enabling a virtually unlimited work life on the stencil. It is a pull-off/peelable nonlatex-based mask.



P/N	Description	1-3	4-11	12+
TC-580-GAL	Mask, 1 gal	\$127.10	\$117.30	\$84.70

## WELLER SPOT MASK™

- Thick, latex-type material masks PCB holes and other surfaces requiring protection
- Won't run, withstands soldering and cleaning environments
- 10-mil coating dries in 2 to 3 hr at ambient temperature and peels clean
- Filtered



P/N	Description	Each
SM1574-8	Spot mask, 8-oz bottle	\$6.20
SM1574-1	Spot mask, 1 gal	72.30

## KESTER/TECHFORM TC-2419 Potting Compound

TC-2419 is a low-cost, general-purpose, room-temperature curing, 2-part, opaque, rigid-epoxy-resin system for the potting or encapsulation of transformers, reactors, or electronic modules.

- Low shrinkage
- Color: black



P/N	Description	1-3	4-11	12+
TC-2419-2LB	2 lb	\$39.60	\$36.75	\$34.30

NOTE: Also available in 40-lb and 8-lb kits.

## KESTER/TECHFORM TC-2490 Low-Viscosity Potting Compound

TC-2490 is a 2-part, resilient epoxy-resin system which is specially formulated to have very low viscosity and high resistance to thermal and mechanical shock. Designed for potting and impregnating of electrical components, TC-2490's very low viscosity naturally minimizes the problems of vacuum impregnation at ambient temperatures. Aside from these outstanding features, TC-2490 has excellent physical and electrical properties which more than qualify its resin as the prime consideration for numerous room-temperature encapsulating applications.

- 1-year shelf life at 77° F
- Color: black



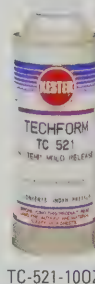
P/N	Description	1-3	4-11	12+
TC-2490-2LB	2 lb	\$39.95	\$37.10	\$34.65

NOTE: Also available in 40-lb and 8-lb kits.

## KESTER/TECHFORM TC-521 High-Temperature Mold Release

TC-521 is a high-temperature release agent and mold lubricant specially formulated for continuous high-temperature (400 °F–500 °F) applications. This colorless, non-staining, low-viscosity liquid has rapidly gained wide acceptance as a superior release agent.

- Requires less material per application
- Gives more cycles per application
- Exhibits no oxidation or residual buildup at high temperatures



P/N	Description	12-24	36-60	72+
TC-521-100Z	Mold release, 10 oz	\$8.10	\$4.65	\$4.25

## CHEMTRONICS KONTACT RESTORER®



This is a 1-step contact cleaner and lubricant.

- Nonflammable
- Extra cleaning strength
- CFC-free, contains HCFCs
- Extends life of contacts
- Protects contacts from carbon buildup, oxidation, and corrosion
- Leaves protective lubricant
- Prevents degradation of electrical signal
- Excellent dielectric properties
- Test before using on plastics

Applications:

- Metal contacts
- Plastic-embedded contacts
- Potentiometers
- Relays
- Circuit breakers
- Fuse blocks
- Electronic controls
- Electrical panels



P/N	Description	Carton Qty.	Each
ES1628	16 oz, aerosol	12	\$12.90

## KESTER MAGIC® Metal Lube

This is a multipurpose lubricant, limited only by the imagination of the user

- Frees moving parts
- Cuts gum and grime
- Cleans as it lubricates
- Penetrates rust
- Displaces moisture
- Protects metal surfaces
- Nonstaining
- Non-conductive



MAGIC-Metal-Lube-9 oz

P/N	Description	Each
MAGIC-Metal-Lube-9 oz	9-oz, aerosol	\$3.55
MAGIC-Metal-Lube-Gal	1 gal	19.10

NOTE: Also available in 5-gal and 53-gal containers.



Have a Question?  
Call Us.



New Product: This symbol represents the industry's latest offerings.

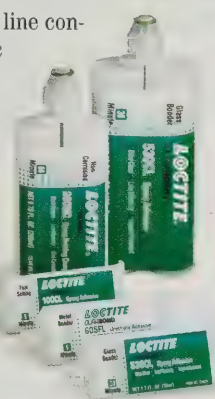


We provide telephone technical assistance with your purchases.



# LOCTITE DURABOND Epoxy Adhesives

The LOCTITE DURABOND line consists of application-specific products that are designed to outperform the competition in all respects—better adhesion, better flow, less odor, improved clarity, higher strength, and improved durability. DURABOND products are designed for use with manual and pneumatic applicators.



## DURABOND 100CL and 100NS Epoxy Adhesives

These are fast-setting, industrial-grade epoxy adhesives. Once mixed, these 2-component epoxies cure at room temperature and form rigid, machineable bond lines. When fully cured, these epoxies are resistant to a wide range of chemicals and solvents, and act as excellent electrical insulators.

P/N	Description	Each
29289	100CL, 50-mL dual cartridge, flowable, clear	\$8.00
29294	100NS, 50-mL dual cartridge, nonsagging, translucent	8.00

NOTE: Also available in 200-mL and 400-mL cartridges.

## DURABOND 105CL, 140FL, 190FL, 420HP, and 460HP Epoxy Adhesives

These are toughened, medium-viscosity, industrial-grade epoxy adhesives that cure at room temperature.

P/N	Description	Each
29299	105CL, 50-mL dual cartridge, high peel-resistance, ultraclear	\$8.50
29304	140FL, 50-mL dual cartridge, shock-resistant, flexible, grey	8.00
29309	190FL, 50-mL dual cartridge, extended work life, flexible, grey	8.00
29314	420HP, 50-mL dual cartridge, high-shear strength, off-white	8.00
29319	460HP, 50-mL dual cartridge, extended life, off-white	8.00

NOTE: Also available in 200-mL and 400-mL cartridges.

## DURABOND 2214HP Paste Epoxy Adhesive

This is a light-paste, industrial-grade epoxy adhesive. Its 1-component, no-mix, heat-activated formulation develops a tough, strong structural bond which provides excellent peel-resistance and impact strength. When fully cured, this product offers superior thermal-shock resistance, excellent mechanical- and electrical-resistance properties, and withstands exposure to a wide variety of solvents and chemicals.

P/N	Description	Each
29339	2214HP, light-paste epoxy adhesive, 6-oz tube	\$6.60

## DURABOND 260NC Epoxy Potting Compound

This is an industrial-grade epoxy potting compound with an extended work life. Once mixed, the 2-part epoxy cures at room temperature to form a rigid, black encapsulant which is noncorrosive to copper-based components on PC boards and electronics assemblies.

P/N	Description	Each
29324	260NC, potting compound, 50-mL dual flowable, cartridge, black	\$7.15

NOTE: Also available in 200-mL and 400-mL cartridges.

## DURABOND 520NS and 530CL Epoxy Adhesives

These are industrial-grade epoxy adhesives. Once mixed, these 2-part epoxies cure at room temperature with minimal shrinkage and form bond lines with excellent impact resistance. When fully cured, these epoxies withstand exposure to a wide range of chemicals and solvents and have excellent dimensional stability over a wide temperature range.

P/N	Description	Each
29334	520NS, 50-mL dual cartridge, nonsagging, medium viscosity, tan	\$8.00
29329	530CL, 50-mL dual cartridge, low viscosity, extra clear	8.00

NOTE: Also available in 200-mL and 300-mL cartridges.

## DURABOND 605FL and 610FL Urethane Adhesives

These are industrial-grade urethane adhesives. Once mixed, these 2-component urethanes cure at room temperature to form highly flexible bond lines which provide excellent peel strength.

P/N	Description	Each
29348	605FL, 50-mL dual cartridge, medium viscosity, off-white	\$8.35
29343	610FL, 50-mL dual cartridge, low viscosity, ultraclear	9.90

NOTE: Also available in 200-mL and 400-mL cartridges.

## DURABOND 7120HP Epoxy Adhesive

This is a high-viscosity, nonsagging, industrial-grade epoxy adhesive with an extended work life. Once mixed, this 2-component epoxy cures at room temperature to form a tough, amber bond line with excellent resistance to peel and impact forces. When fully cured, this epoxy offers superior thermal-shock resistance, excellent mechanical- and electrical-resistance properties, and withstands exposure to a wide variety of solvents and chemicals.

P/N	Description	Each
29353	7120HP, 50-mL dual cartridge, high viscosity, amber	\$8.00

NOTE: Also available in 200-mL and 400-mL cartridges.

## Dispensing Equipment and Accessories

DURABOND adhesives are easily dispensed through hand-held, metered-mix dispensing systems. These systems provide a convenient, cost-effective method for accurately applying DURABOND adhesives with minimal waste. The 50-mL manual dispenser/gun is for use with DURABOND 50-mL double-barrel cartridges. It comes with 2 different plungers, allowing it to be used with either 1:1- or 2:1-ratio cartridges. The luer-lock adapter easily self threads onto stepped-end mixing nozzles. It allows for easy attachment of standard dispensing needles for precise application of DURABOND adhesives.



P/N	Description	Each
983435	50-mL manual dispenser/gun	\$30.00
983441	6.3-mm mixer nozzles for 50-mL cartridges, 10/bag	7.50
983444	Luer-lock adapters for mixer nozzles, 10/bag	4.50

NOTE: Dispensers for 200-mL and 400-mL cartridges are also available (manual or pneumatic).

## CHEMTRONICS FOAMCLEAN™ Label-Adhesive Remover

- Effectively removes adhesive residue left by tape, stickers, and labels from: plastic, metal, glass, and ceramic surfaces
- Peel away label, spray foam on adhesive residue, and wipe clean when the foam collapses
- No-drip foaming cleaner clings to vertical surfaces
- Engineered for use on plastics and decorative materials
- Pleasant, fresh scent
- CFC- and HCFC- free

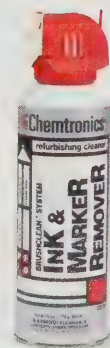


ES805

P/N	Description	Each
ES805	6-oz aerosol	\$8.05

## CHEMTRONICS BRUSHCLEAN™ Ink and Marker Remover

Finally, a quick, easy way to safely remove ugly marks from plastic surfaces. This cleaner dissolves marks left by pens, markers, lead pencils, stamp pads, crayons, wax-based materials, and other inks without harming plastic surfaces. Use it with the brush to scrub away ink from even the tiniest crevices—make your phones, computers, and other office equipment look like new again.



ES806B

P/N	Description	Each
ES806B	6-oz aerosol	\$7.60





### LOCTITE 3608 Acrylic Surface-Mount Adhesive

• Designed to provide additional green strength with UV cure for difficult components such as MELFs and tall chips • Low durometer-measured hardness for reduced stress on glass diodes

P/N	Description	1-9	10+
23288	30-mL FUJI with low-level-sensing piston	\$59.15	\$51.45
24424	20-mL PANASERT	39.30	34.15

Products with this symbol ship directly from the manufacturer.

### LOCTITE 3610 Epoxy Surface-Mount Adhesive

• Designed for high-speed dot placement • Good green strength • Color: yellow

P/N	Description	1-9	10+
24043	10-mL EFD	\$31.50	\$27.40
24042	20-mL PANASERT with low-level-sensing piston	42.35	36.85
24041	30-mL EFD	73.35	63.80
24040	30-mL FUJI with low-level-sensing piston	73.35	63.80
23230	30-mL IWASHIA with low-level-sensing piston	67.80	58.95

Products with this symbol ship directly from the manufacturer.

### LOCTITE 3611 Epoxy Surface-Mount Adhesive

• Formulated for pin-transfer applications • Very low moisture pickup • Designed for use with open-reservoir applications

P/N	Description	Each
25410	300-mL SEMCO cartridge	\$297.10

Products with this symbol ship directly from the manufacturer.

### LOCTITE 3612 Epoxy Surface-Mount Adhesive

• Specifically formulated for VARIDOT™ and metal-stencil print applications • Color: yellow

P/N	Description	Each
26654	300-mL SEMCO red cartridge	\$341.45
26655	12-oz PYLES natural cartridge	341.45

Products with this symbol ship directly from the manufacturer.

### LOCTITE 3614 Epoxy Surface-Mount Adhesive

• Specifically formulated for VARIDOT™ and metal-stencil print applications • Color: red

P/N	Description	Each
26652	300-mL SEMCO red cartridge	\$341.45
26653	12-oz PYLES natural cartridge	341.45

Products with this symbol ship directly from the manufacturer.

### LOCTITE 3615 Epoxy Surface-Mount Adhesive

• Designed for high-speed dot placement • Good green strength • Offers improved adhesion to low-stress molding compounds found on many SMT packages • Color: red

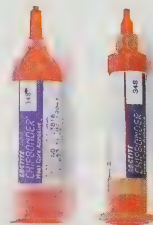
P/N	Description	1-9	10+
28564	9-mL GLT	\$28.20	\$23.90
28565	10-mL EFD	32.95	27.95
28568	30-mL EFD	76.55	64.90
28570	20-mL PANASERT with low-level-sensing piston	44.35	37.60
28569	30-mL FUJI with low-level-sensing piston	76.75	65.05

Products with this symbol ship directly from the manufacturer.

### LOCTITE Adhesives for Surface-Mount Devices

LOCTITE CHIPBONDER™ adhesives are fast-curing, one-part-thixotropic adhesives for bonding surface-mounted devices to printed circuit boards.

• Well-suited for use with syringe dispensers and pin-transfer systems • Rounded dot profile • Fast heat cure



17723 17818

### LOCTITE CHIPBONDER 348

P/N	Description	1-9	10+
17723	CHIPBONDER 348, 10-mL EFD syringe	\$25.25	\$23.45
17818	CHIPBONDER 348, 20-mL PANASERT syringe	36.90	34.25
18191	CHIPBONDER 348, 30-mL FUJI syringe	55.90	51.90

### LOCTITE CHIPBONDER Adhesive 3609

• High-speed syringe dispenser • Peaked-dot profile • Very fast heat cure



20236

P/N	Description	1-9	10+
20236	CHIPBONDER 3609, 10-mL EFD syringe	\$31.50	\$27.40
21555	CHIPBONDER 3609, 20-mL PANASERT syringe	62.60	36.85
19873	CHIPBONDER 3609, 30-mL FUJI syringe	78.00	72.40
20235	CHIPBONDER 3609, 30-mL EFD syringe	73.15	63.60

### LOCTITE 7360 Surface-Mount-Adhesive Cleaner

• Suitable for cleaning needles, valves, stencils, and PCBs • Compatible with most solder masks and epoxy adhesives • Does not initiate the cure of surface-mount adhesives • Contains no ozone-depleting chemicals



25658

P/N	Description	1-9	10+
25658	7360 cleaner, 500 ml, pour-top can	\$52.00	\$40.05

### LOCTITE Light-Curing Adhesives: 3102, 3103, 3104, 3105, and 3106

These are UV/visible-light-curing adhesives for flexible bonds and reduced stress cracking on plastics.

• 3102: flexible, low modulus, medium viscosity • 3103: flexible, low modulus, high viscosity • 3104: high strength, low-viscosity wicking • 3105: high strength, low viscosity • 3106: high strength, medium viscosity



23689 23694 23697

P/N	Description	1-9	10+
23689	3102, 25-mL syringe	\$28.15	\$22.10
23691	3103, 25-mL syringe	28.15	22.10
23694	3104, 25-mL syringe	28.15	22.10
23695	3105, 25-mL syringe	28.15	22.10
23697	3106, 25-mL syringe	28.15	22.10

### LOCTITE ODC-Free TAK PAK 444 Instant Adhesive

TAK PAK 444 is an instant adhesive formulated specifically for printed-circuit board assembly and repair. It cures instantly with ODC-free TAK PAK 7452 accelerator. It can also be applied with high-speed-process equipment.

### LOCTITE ODC-Free Ultrapformance TAK PAK 382

ODC-free TAK PAK 382 is a high-temperature high-viscosity product similar to TAK PAK 444.



12292 38240 18490

P/N	Description	1-9	10+
20419	ODC-free TAK PAK 444, instant-adhesive kit	\$20.90	\$18.45
12292	ODC-free TAK PAK 444, 20-g bottle	11.70	10.10
20420	ODC-free TAK PAK 382 kit	28.60	26.30
38240	ODC-free TAK PAK 382, 20-g bottle	18.15	13.35
18490	ODC-free TAK PAK 7452 accelerator, 1.75 oz, brush-top bottle	6.25	4.70
18575	ODC-free TAK PAK 7452 accelerator, 1-qt can	29.30	26.35
18636	ODC-free TAK PAK 712 accelerator	10.80	8.80
20352	ODC-free TAK PAK 712 accelerator, 1.75 oz, brush-top bottle	6.60	4.95



## LOCTITE PRISM® Instant Adhesives

PRISM adhesives are LOCTITE's highest-performance instant adhesives. They work where other instant adhesives fail. They are specially formulated to provide the strongest bond on hard-to-bond surfaces and resist extreme environmental conditions.



### LOCTITE PRISM 401

This is the best general-purpose liquid instant adhesive.

P/N	Description	1-9	10+
40104	PRISM 401, 3-g tube	\$3.95	\$3.25
40140	PRISM 401, 20-g bottle	16.25	12.15

### LOCTITE PRISM 406

• Provides excellent results with difficult-to-bond rubber compounds

P/N	Description	1-9	10+
40640	PRISM 406, 20-g bottle	\$16.25	\$12.15

### LOCTITE PRISM 447

P/N	Description	1-9	10+
44740	PRISM 447, 20-g bottle	\$16.25	\$12.15

### LOCTITE PRISM 454

• Best general-purpose, nonflowing gel adhesive  
• Ideal for porous substrates

P/N	Description	1-9	10+
21925	Prism 454, 10-g syringe	\$11.50	\$9.30
45404	Prism 454, 3-g tube	3.95	3.25
45440	Prism 454, 20-g tube	17.15	13.65
45474	Prism 454, 200-g tube	97.18	93.15

### LOCTITE Prism 4204

This adhesive maintains its strength at elevated temperatures significantly longer than other instant adhesives, so you can expand your applications envelope and improve product quality.

• Good gap filling ability  
• Thermal resistant  
• Color: clear



26324

P/N	Description	1-9	10+
26324	Prism 4204, 20 g. tube	\$19.90	\$15.00

## LOCTITE PRISM Toughened Instant Adhesives

These adhesives combine excellent peel and impact resistance with shear strength. Designed for high stress, temperature, humidity, vibration and impact applications, these adhesives come in two colors and clear.

### LOCTITE PRISM 411

• Good gap-filling ability • Color: clear

P/N	Description	1-9	10+
41104	Prism 411, 3-g tube	\$3.95	\$3.25
41145	Prism 411, 20-g bottle	18.15	13.35

### LOCTITE BLACK MAX™ 380

• Excellent peel, impact, and tensile-shear strength  
• Bonds metal, rubber, and plastics up to 223 °F

P/N	Description	1-9	10+
38004	Black Max 380, 3-g tube	\$3.95	\$3.25
38050	Black Max 380, 1-oz bottle	21.30	17.25

## LOCTITE PRISM Low-Odor, Low-Bloom Instant Adhesives

• Specially formulated for appearance-sensitive assemblies • Low odor eliminates the need for sophisticated ventilation systems • The low bloom eliminates bond line whitening in appearance-sensitive applications

### LOCTITE PRISM 403

• For slip-fit or loosely-fitted parts

P/N	Description	1-9	10+
40340	PRISM 403, 20-g bottle	\$18.65	\$15.05

### LOCTITE PRISM 460

• General-purpose, low-bloom

P/N	Description	1-9	10+
46004	PRISM 460, 3-g tube	\$3.95	\$3.25
46040	PRISM 460, 20-g bottle	18.65	15.05

### LOCTITE PRISM Primer 793

• Makes polyolefin and other low-energy plastics suitable for bonding with LOCTITE cyanoacrylate adhesives

P/N	Description	1-9	10+
18650	PRISM Primer 793, 1.75 fl oz	\$9.55	\$8.30



*New Product: This symbol represents the industry's latest offerings.*



*We are a full-service distributor with a broad range of the best products.*

## LOCTITE SUPER BONDER Instant Adhesives

These adhesives offer a wide range of application versatility. They may be applied directly from containers or with automated equipment. They contain no solvents, are non-flammable, and have low toxicity.



### LOCTITE QUICK SET™ 404

• Specially suited for bonding rubber parts such as belts, bumpers, cushions, and O-rings

P/N	Description	1-9	10+
46551	QUICK SET 404, 1/3-oz bottle	\$16.40	\$14.00

### LOCTITE SUPER BONDER 414

• High-strength adhesive ideal for bonding plastic and vinyl parts with gaps to .006" • Good humidity and weather resistance

P/N	Description	1-9	10+
41404	SUPER BONDER 414, 3-g tube	\$3.10	\$2.75
41450	SUPER BONDER 414, 1-oz bottle	16.35	13.75

### LOCTITE SUPER BONDER 416

• Designed to bond irregular surfaces or fill large gaps between mating surfaces up to .008" • This slow-setting adhesive allows adjustment of parts during assembly

P/N	Description	1-9	10+
41650	SUPER BONDER 416, 1-oz bottle	\$14.65	\$12.25

### LOCTITE SUPER BONDER 420

• Designed to penetrate by capillary action between pre-assembled components • Parts must be close-fitting to fill gaps to .002"

P/N	Description	1-9	10+
42050	SUPER BONDER 420, 1-oz bottle	\$14.65	\$12.25

### LOCTITE SUPER BONDER 430

• Fills gaps to .005" • Especially effective on metallic surfaces

P/N	Description	1-9	10+
43050	SUPER BONDER 430, 1-oz bottle	\$14.95	\$12.45



**LOCTITE SUPER BONDER 495**

General-purpose instant adhesive designed to bond rubber, metal, and plastic parts with gaps to .004"

P/N	Description	1-9	10+
49595	SUPER BONDER GLUEMATIC pen, .07 fl oz	\$3.10	\$2.75
49504	SUPER BONDER 495, 3-g tube	3.00	2.25
49550	SUPER BONDER 495, 1-oz bottle	14.65	12.25

**LOCTITE SUPER BONDER 496**

• High-strength instant adhesive ideal for bonding metal surfaces with gaps to .006"

P/N	Description	1-9	10+
49650	SUPER BONDER 496, 1-oz bottle	\$14.95	\$12.50

**LOCTITE SUPER BONDER 498**

• Thermal-cycling adhesive, resists continuous temperatures up to 223 °F, intermittent to 250 °F

P/N	Description	1-9	10+
49850	SUPER BONDER 498, 1-oz bottle	\$16.50	\$13.90

**LOCTITE SUPER BONDER 499**

• Thixotropic, high-temperature (to 223 °F, intermittent to 250 °F) gel formulation bonds all metals, and most plastics and rubber compounds  
• Offers excellent thermal-cycling resistance

P/N	Description	1-9	10+
49904	SUPER BONDER 499, 3-g tube	\$3.20	\$2.80
49945	SUPER BONDER 499, 20-g tube	13.70	11.30

**LOCTITE SPEED BONDER 325**

• Solvent-resistant, activator-cured adhesive  
• Cures in minutes when in contact with activator 707 and forms flexible bonds on gaps up to .040" thick  
• Designed for severe environments and temperatures to 350 °F



21348      22671      32530

P/N	Description	1-9	10+
32530	SPEED BONDER 325, 50-mL bottle	\$12.95	\$11.20
22671	Activator 7075, 4.5 oz, aerosol	18.80	14.90
21349	Activator 7075, 1-qt can	55.60	50.55

**LOCTITE SPEED BONDER 326**

• Activator-cured adhesive with very fast cure speed • Bonds rapidly when cured with LOCQUIC Primer N • Strong bonds on gaps up to .020" thick

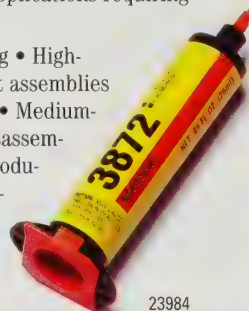
P/N	Description	1-9	10+
32629	SPEED BONDER 326, 50-mL bottle	\$13.95	\$12.15
19269	Primer N 7649, 1.75 oz bottle	9.75	8.80
21348	Primer N 7649, 4.5 oz, aerosol	15.90	12.65

**LOCTITE 3870, 3871, 3872 Thermally-Conductive Adhesives**

LOCTITE brings you a new technology: single-component, UV/heat-cure, thermally-conductive acrylics.

These adhesives are designed to provide thermal management for applications requiring fast processing.

• Fast UV-cure fixturing • High-strength for permanent assemblies and extreme exposure • Medium-strength permitting disassembly-heat sinks • Low modulus for sensitive components • Due to shelf life, this product is drop-ship only from factory



23984

P/N	Description		1-9	10+
23978	3870, 25-mL syringe, high modulus	+	\$19.55	\$15.40
23979	3870, 300-mL syringe, high modulus	+	114.60	99.65
23981	3871, 25-mL syringe, medium modulus	+	19.55	15.40
23982	3871, 300-mL syringe, medium modulus	+	114.60	99.65
23984	3872, 25-mL syringe, low modulus	+	19.55	15.40
23985	3872, 300-mL syringe, low modulus	+	114.60	99.65

✚ Products with this symbol ship directly from the manufacturer.

**LOCTITE 315 and 3151 Thermally Conductive Adhesives****315**

• Self-shimming • Cures at room temperature • Maintains electrical isolation

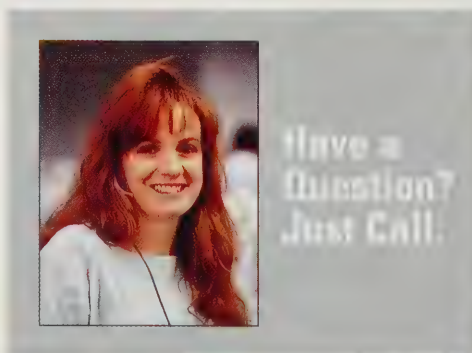
**3151**

• Self-shimming • Cures by UV/heat • Repairable  
• For automated heat-sink applications



P/N	Description		1-9	10+
31520	315 adhesive, 25-ml syringe	+	\$18.50	\$16.10
31575	315 adhesive, 300-ml cartridge	+	101.50	88.30
18843	3151 adhesive, 300-ml cartridge	+	110.30	88.25

✚ Products with this symbol ship directly from the manufacturer.



Products with this symbol ship directly from the manufacturer.

**LOCTITE Thermally-Conductive Adhesives**

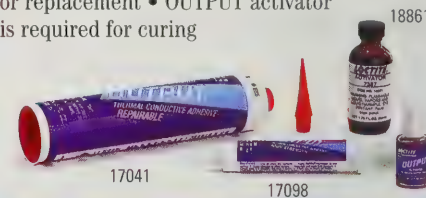
Formulated for heat-dissipation applications, LOCTITE OUTPUT™ adhesives are no-mix and feature excellent thermal conductivity. These adhesives are designed to replace costly mechanical fasteners, silicone grease (that may collect contaminants) and epoxies requiring precise mixing and off-line curing. OUTPUT activator is required for curing.

**LOCTITE OUTPUT 383**

• A high-strength adhesive for permanent component mounting to heat sinks • OUTPUT activator required for rapid, room-temperature cure

**LOCTITE OUTPUT 384**

• Repairable adhesive mounts components to heat sinks, and allows component removal for repair or replacement • OUTPUT activator is required for curing



17041

17098

18861

P/N	Description	1-9	10+
17098	OUTPUT 383, 25-mL syringe	\$14.60	\$11.85
12991	OUTPUT 383, 300-mL cartridge	90.50	86.65
21086	OUTPUT 383, kit (25-mL syringe, adhesive, 13 mL activator)	21.15	19.95
17099	OUTPUT 384, 25-mL syringe	16.10	12.95
17041	OUTPUT 384, 300-mL cartridge	99.50	95.20
21087	OUTPUT 384, kit (25-mL syringe, adhesive, 13-mL activator)	22.65	21.30
20263	OUTPUT activator, 13-mL brush-top bottle	11.55	8.65
21085	OUTPUT activator, 1-qt can	89.90	82.15
18861	ODC-Free activator, 1.75 oz	9.60	8.60
18862	ODC-Free activator, 1 qt	55.20	50.00

**LOCTITE WORLDWIDE DESIGN HANDBOOK**

The handbook includes 464 pages of detailed engineering data, color illustrations, compatibility tables, and definitions for adhesive, sealant, and coating technologies.

Get the latest technical information for adhesives, sealants, and coatings including material and performance properties, process requirements, and application details for:

- Bonding • Gasketing
- Threadlocking
- Thread sealing
- Porosity sealing
- Retaining cylindrical assemblies
- Electronic assembly aids • Dispensing and curing



24086

P/N	Description	Each
24086	Design handbook, hardcover	\$25.00



## LOCTITE 3885 2-Component Electrically Conductive Adhesive

- Room-temperature cure for attaching heat-sensitive components-molded interconnects • PCB repair, passive- and active-component replacement
- Bonding RFI/EMI gaskets • Ground paths • Drop-ship only

P/N	Description	1-9	10+
24142	3885, 2-component, silver-filled, 4.3-g A-pack	16.00	12.60

## LOCTITE Retaining Compound 609

- Low-viscosity, rapid-curing liquid • Augments the strength of press-fitted assemblies • Can be used on slip fits up to .005" diametral clearance
- Fixtures in 10 min on unprimed steel at room temperature • Provides a shear strength of 3,000 psi at full cure



P/N	Description	1-9	10+
60921	Retaining Compound 609, 10-mL bottle	\$10.90	\$9.25
68031	Retaining Compound 609, 50-mL bottle	27.85	24.45

## LOCTITE Retaining Compound 620

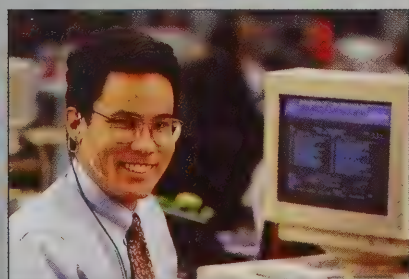
- High-temperature, high-viscosity liquid
- Fixtures in 30 min at room temperature
- Provides a shear strength of 3,000 psi on steel
- Temperature range: -65 °F to +450 °F

P/N	Description	1-9	10+
62040	Retaining Compound 620, 50-mL bottle	\$32.35	\$27.90

## LOCTITE Retaining Compound 680

- Medium-viscosity, fast-curing liquid • Fixtures in 10 min at room temperature • Provides a shear strength of 4,000 psi on steel

P/N	Description	1-9	10+
68035	Retaining Compound 680, 50-mL bottle	\$32.35	\$27.90



Call Us. We're Here to Help.

## LOCTITE Threadlockers

In response to industry needs, LOCTITE pioneered threadlockers with precisely controlled strength, resistant to extreme environments, and even pre-applied threadlockers for high-volume applications and easier inspection.



### LOCTITE Threadlocker 243

- Medium strength, general purpose • Ideal for all nut and bolt applications • Especially well-suited for 1/4" or larger fasteners

P/N	Description	1-9	10+
24077	Threadlocker 243, 10-mL bottle	\$12.00	\$9.25
24078	Threadlocker 243, 50-mL bottle	30.65	23.60

### LOCTITE Threadlocker 222

- Low strength • Perfect for small fasteners, long-engagement-length fasteners and components requiring occasional adjustment • Best for 1/4" and smaller fasteners • Removable with hand tools

P/N	Description	1-9	10+
22221	Threadlocker 222, 10-mL bottle	\$10.90	\$9.20
22231	Threadlocker 222, 50-mL bottle	27.85	24.40

### LOCTITE Threadlocker 262

- High strength • Designed for extreme environmental/chemical conditions • Especially useful where Grade 5 and 8 fasteners are subjected to heavy shock, vibration and stress levels • Removable with heat and hand tools

P/N	Description	1-9	10+
26221	Threadlocker 262, 10-mL bottle	\$10.90	\$9.20
26231	Threadlocker 262, 50-mL bottle	28.85	24.40

### LOCTITE Threadlocker 290

- Formulated especially for pre-assembled fasteners • Penetrates by capillary action • Simplifies preventive maintenance • Also used to seal welds

P/N	Description	1-9	10+
29021	Threadlocker 290, 10-mL bottle	\$10.90	\$9.25
29031	Threadlocker 290, 50-mL bottle	27.85	24.40

### LOCTITE ASSURE™ 425

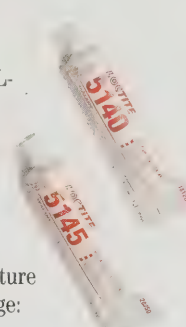
- A low-strength, fast surface-curing threadlocker for plastic and metal fasteners • Can be pre- or post-assembly applied

P/N	Description	1-9	10+
42540	ASSURE 425, 20 g bottle	\$16.40	\$12.25

## LOCTITE High-Tech RTV Silicones

LOCTITE 5140 and LOCTITE 5145 RTV silicones are noncorrosive adhesive/sealants. They adhere to metals, glass, ceramics, silicone rubber, and most plastics.

- LOCTITE 5140:** • Meets MIL-A-46146B, Group I, and Type II • For potting, sealing, and coating electronic devices • Translucent • Self-leveling • Cures to form a tough rubber coating when exposed to atmospheric moisture
- Operating temperature range: -65 °F to 400 °F

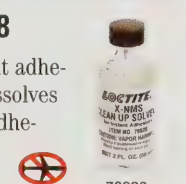


- LOCTITE 5145:** • Meets MIL-A-46146B, Group II, Type I • Used for bonding and sealing electronic devices • Translucent • Non-slumping thixotropic paste • Cures to form a high-strength rubber when exposed to atmospheric moisture

P/N	Description	1-9	10+
18117	Sealant 5140, 10.8 fl oz cartridge	\$32.35	\$28.60
18120	Sealant 5140, 85 g tube	21.75	11.75
19803	Adhesive/sealant 5145, 300 ml cartridge	51.80	45.70
20250	Adhesive/sealant 5145, 3 oz tube	24.10	15.40

## LOCTITE X-NMS™ 768

- Clean-up solvent for instant adhesives • Quickly and safely dissolves cured cyanoacrylate-based adhesives between parts or on surfaces



P/N	Description	1-9	10+
76820	X-NMS 768, 2-oz bottle	\$19.25	\$16.50

## JNJ Epoxy and Adhesive Cleaner

This is a super-aggressive solvent for cleaning off most varieties of glue or adhesive residues—also excellent for cleaning off screen-printable epoxies used in electronics.

- CFC- and HCFC-free • Superior wet-out • Low surface tension
- High penetration • Noncorrosive • Low toxicity



P/N	Description	Each
SW50EAD	50-wipe canister, SUPERSATURATED SMARTWIPES	\$16.75
SW100EAD	100-wipe canister, SUPERSATURATED SMARTWIPES	21.00
SB6EAD	1-pt, trigger SMARTSPRAY antistatic-plastic bottle	16.00
GA6EAD	1-gal, high-density polyethylene container	40.00



We provide telephone technical assistance with your purchases.



Products with this symbol cannot be shipped via air, due to restrictions.



## CHEMTRONICS CircuitWorks™ Products/Tools for Repairs and Prototypes

This complete line of quick-drying, easily applied products is packaged in conveniently sized applicators/dispensers. The coatings air dry in minutes at room temperature, thereby speeding up the prototype and design process.

### Overcoat Pen

- Applies a tough protective conformal coating
- Protects conductive pen traces
- Repairs permanent solder masks
- Protects against shorting, arcing, abrasion, and moisture

P/N	Description	Each
CW3300C	Clear overcoat pen, 0.16 oz (4.9 g)	\$11.60
CW3300G	Green overcoat pen, 0.16 oz (4.9 g)	11.60

### Conductive Pen

- Draws highly conductive silver traces, jumpers, and shielding with precision and control
- Quickly creates silver conductive traces on most surfaces
- Valved pen tip for easy application
- Solderable at low temperatures

P/N	Description	Each
CW2200STP	Standard-tip conductive pen, 0.3 oz (8.5 g)	\$13.95
CW2200MTP	Micro-tip conductive pen, 0.3 oz (8.5 g)	13.95

### Flex Conductive Pen

- Draws conductive traces on flexible and ITO surfaces
- Makes instant flexible-conductive-silver traces on MYLAR and flexible circuitry
- Micro tip for precise applications
- Solderable at low temperatures

P/N	Description	Each
CW2900	Flexible-conductive-silver pen, 0.3 oz (8.5 g)	\$17.50

### No-Clean Flux-Dispensing Pen

- Applies a patented, noncorrosive, halide-free, organic no-clean flux with precision and control
- Chisel-tip marker-type applicator
- Meets BELL-CORE TR-NWT-000078 and IPC SF-818 for surface insulation resistance

P/N	Description	Each
CW8100	No-clean flux-dispensing pen, 0.32 oz (9 g)	\$5.00

### Rosin Flux-Dispensing Pen

- Applies a noncorrosive Type-R flux with precision and control
- Chisel-tip marker-type applicator
- Meets MIL-F-14256 E+F Type-R and RMA flux specifications
- Easily removed with rosin-flux-remover pen

P/N	Description	Each
CW8200	Rosin flux-dispensing pen, 0.32 oz (9 g)	\$4.85

### No-Clean Flux Remover Pen

- Precisely removes no-clean fluxes from printed-circuit boards in seconds
- Marker-type applicator

P/N	Description	Each
CW9100	No-clean flux remover pen, 0.32 oz (9 g)	\$6.50



### Rosin Flux Remover Pen

- Precisely removes rosin fluxes from printed-circuit boards
- Marker-type applicator

P/N	Description	Each
CW9200	Rosin flux remover pen, 0.28 oz (8 g)	\$6.20

### Water-Soluble Flux Remover Pen

- Precisely removes water-soluble fluxes from printed-circuit boards

P/N	Description	Each
CW9300	Water-soluble flux remover pen, 0.28 oz (8 g)	\$6.20

### Conformal Coating Remover Pen

- Precisely removes silicone, acrylic, and urethane coatings from PCBs
- Evaporates quickly and provides low surface tension

P/N	Description	Each
CW3500	Conformal coating remover pen, 0.32 oz (9 g)	\$8.30

### GOLD GUARD™ Pen

- Cleans, lubricates, and extends the life of gold and other noble-metal contacts and connectors in 1 step
- Chisel-tip marker-type applicator
- Safe on most plastics

P/N	Description	Each
CW7400	GOLD GUARD pen, 0.3 oz (8 g)	\$7.80

### Heat Sink Grease

- Tube dispenser
- Contains a silicone compound that facilitates heat transfer away from electronic components
- Excellent thermal conductivity and dielectric properties
- Does not dry out, harden, or melt
- Noncorrosive and nonflammable
- Thermally stable from -40 °F (-40 °C) to +342 °F (172 °C)
- Meets MIL-C-47113

P/N	Description	Each
CT40-5	Heat sink grease, 5 oz (142 g)	\$12.10

**New Product:** This symbol represents the industry's latest offerings.

### Connector Lubricant

- Syringe dispenser
- Provides excellent lubrication properties
- Protects against galling of metal contacts and connectors
- Prevents contact oxidation
- Protects from -40 °C to +130 °C

P/N	Description	Each
CW7300	Connector lubricant, 0.10 oz (3 g)	\$7.50

### Fast-Setting Epoxy

- Dual-syringe epoxy dispenser
- Creates a strong bond between dissimilar materials in minutes
- Cures in 5 min
- High-strength rigid bond
- Operating temperature range: -50 °F (-46 °C) to +150 °F (65 °C)

P/N	Description	Each
CTXY5	Fast-setting epoxy, 1.1 oz (31.6 g)	\$6.50

### Conductive Epoxy

- High-strength conductive silver epoxy with excellent electrical conductivity
- Repairs defective traces and creates jumpers on boards
- Quick solderless electronic connections

P/N	Description	Each
CW2400	Conductive epoxy, .25 oz (7 g)	\$17.45

### MICROBOND™ III Adhesive

- Medium-viscosity cyanoacrylate adhesive
- Quickly bonds nonporous surfaces, metals, plastics, glass, ceramics, and rubber
- Fast-setting adhesive
- Meets MIL-A-46050C Type II, Class I

P/N	Description	Each
CTCA3-3	MICROBOND III adhesive, 0.1 oz (3 g)	\$1.90
CTCA3-1	MICROBOND III adhesive, 1.1 oz (31 g)	9.00

### Quick-Bond Gel-Adhesive Kit

- Conveniently packaged adhesive kit for easy and instant bonding of rubber, metal, and plastic
- Ideal for wire tacking
- Gel formula is easy to apply and stays in place
- Accelerator insures reliable and instant bonding

P/N	Description	Each
CW4300	Quick-bond gel-adhesive kit, adhesive (0.10 oz [3 g]), accelerator (0.07 oz [2g])	\$6.90





## **CIRCUITWORKS®. PRECISE CONTROL. INFINITE CONVENIENCE. NOW AVAILABLE ON A PLANET NEAR YOU.**

Make a quantum leap with CircuitWorks® repair and prototyping tools. By far the widest range of conveniently packaged, precisely dispensed repair materials in the known universe. In all, 32 products for precise control and faster, easier application.

Wield the power of spot cleaning with the Conformal Coating Remover Pen. Conductive Pens that instantly repair traces, now even on flex circuitry. Overcoat Pens for conformal coating. Flux Remover Pens with pinpoint accuracy. Even a Rubber Keypad Repair Kit.

Gifts from an advanced life form, or another breakthrough from the fertile minds at Chemtronics? Try them and decide for yourself.

For additional information please visit the @ONCE web at [www.4atonce.com](http://www.4atonce.com) or call (800) 261-9602 Ext. 4002.





## AIRIDUS High-Volume Extraction and Purification Systems

**AIRIDUS**  
LEADING PURIFICATION TECHNOLOGY

*\*Electronic Gas-Sensing Technology*



V200 Series

V400 and V600 Series



P/N	Description	Voltage/Frequency	Filters Included	Each
V201-16-1	Fume-extraction unit 27.75" x 16.8" x 15.8"	110 V, 60 Hz	Pre/HEPA/gas	\$1195.00
V401-16-1	Fume-extraction unit* 25.8" x 16.8" x 15.8"	110 V, 60 Hz	Pre/HEPA/gas	1795.00
V601-16-1	Fume-extraction unit* 28.9" x 19.5" x 19.1"	110 V, 60 Hz	Pre/HEPA/gas	2495.00

\*Includes electronic gas-sensing technology.

Series	Flow Rates (Free-Blowing) 60 Hz CFM	Max. Pressure 60 Hz InH2O	Noise Level 60 Hz dBA	Power Consum. 60 Hz kW	Max. Weight (Net) lb	Inlet Ports Qty. and Dia.
V200	352	3.5	60	0.5	77	(2) 3.0"
V400	258	4.5	60	0.5	77	(1) 3.0"
V600	388	9.0	62	0.6	105	(2) 3.0"

Series	Max. No. of 32-mm Arms 60 Hz	Max. No. of 50-mm Arms 60 Hz	Max. No. of 75-mm Arms 60 Hz	Max. No. of BT Plenums 60 Hz	Maximum Duct Run	Micro- Processor Control
V200	4	2	2	2	20'	No
V400	4	2	1	1	20'	Yes
V600	8	5	2	2	100'	Yes

## AIRIDUS Single-Arm Push-Fit Ducting Kit

Includes: • 75-mm x 1.5-m ducting, predrilled for boss adapter • (2) 75-mm in-line couplings • 75-mm 90° elbow • 75-mm end blank • (2) 75-mm pipe clips • 50-mm rubber boss adapter • 50-mm to 40-mm reducer • (5) 370-mm heavy-duty tie wraps • Silicone lubricant

P/N	Description	Each
AK-1	Ducting kit	\$97.75

## AIRIDUS 50-mm-Diameter Stainless-Steel Flexi-Arm Kit

The flexi-arm can be adjusted to any position and easily mounted to a bench. It is ideal for extraction over solder pots and dispensing and adhesive applications.

- Integral balance valve • Robust design
- ESD-safe • Ground cord • Several push-fit nozzles are available



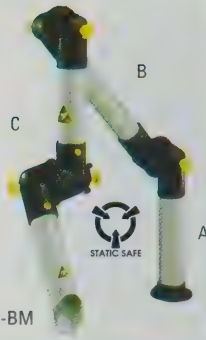
SS-50BME with 20230S  
1.25" (32-mm) Pen-Nib Nozzle

P/N	Description	Each
SS-50BME	Stainless-steel flexi-arm kit	\$199.00

NOTE: Nozzles are not included.

## AIRIDUS 50-mm and 75-mm Articulated Extraction Arms

AIRIDUS offers a range of multiposition articulated arms. These arms are recommended for use with the low-pressure-, high-volume-series products. The System 50 is available in standard, ESD-safe, and 2- or 3-jointed versions. Both the System 50 and System 75 can be fitted with a variety of nozzles and hoods—see below.



AA375-BM

P/N	Description	Each
AA250-BME	50-mm (dia.) ESD-safe bench-mounted extraction arm, 2 joints, overall reach: 15.75"	\$209.00
AA350-BME	50-mm (dia.) ESD-safe bench-mounted extraction arm, 3 joints, overall reach: 21.7"	259.00
AA375-BM	75-mm (dia.) bench-mounted extraction arm, 3 joints	299.00
19973S	Bench bracket with clamps	59.00

## Airidus System 50 and System 75 Hoods and Nozzles



P/N	Description	Each
19962S	System-50 suction nozzle, 8" (200 mm), ESD-safe	\$114.00
19969S	System-50 clear extraction hood, 9.6" x 8.6" (245 mm x 220 mm)	89.00
19970S	System-75 clear extraction hood, 16.5" x 12.6" (420 mm x 320 mm)	99.00
19967S	System-50 suction tube, 12.2" (310 mm), ESD-safe	34.00

## AIRIDUS Bench-Top Plenum

- Easy to install and relocate • Clear-acrylic construction • Effective over a wide area • Ideal for heavy soldering and rework • 3" (75-mm) extraction port
- Includes: 4.9' (1.5 m) of 75-mm-diameter flexi-hose • Black ESD-safe version available • For light/medium/heavy hand soldering, adhesive and chemical applications, SMT rework, small conformal-coating operations, potting resins



BTP-75

P/N	Description	Each
BTP-75	Clear bench-top plenum with flexi-hose	\$150.00
BTP-75-ESD	Black bench-top plenum, ESD-safe, with flexi-hose	235.00

## AIRIDUS Low-Cost, Plastic Flexi-Arm

For greater flexibility at a lower cost, the lightweight, plastic flexi-arm is an ideal solution.

- Highly flexible • Complete with flexi-hose and pen-nib nozzle • Low cost • Integral balance valve • Easy to bench mount • Optional small, clear hood available (for DS03-911 only)
- Choice of 32-mm or 50-mm arms



DS03-911

P/N	Description	Each
DS03-911	Macro-arm kit, 1.25" (32-mm) diameter, with bench bracket	\$149.00



## AIRIDUS Microprocessor-Controlled T-Series High-Pressure Extraction and Purification Systems



AIRIDUS has developed a revolutionary and unique approach for protecting workers from hazardous fumes. It is a system for purification and the total monitoring of air that is released into the workplace and environment. A user-friendly microprocessor control panel manages the system. The touch-sensitive backlit digital display makes it easy to monitor filter life, gas/particulate conditions, temperature, and running/service time. Auto diagnostics give audible and visual prompts that warn the operator of impending service requirements.

**\*Electronic Gas-Sensing Technology**



T80 Series

P/N	Description	Voltage/Frequency	Filters Included	Each
T081-16-1	8-station fume-extraction unit* 20.7" x 14.2" x 13.9"	115 V, 60 Hz	Pre/HEPA/gas	\$1695.00
T151-16-1	15-station fume-extraction unit* 22.6" x 16.8" x 16.9"	115 V, 60 Hz	Pre/HEPA/gas	2395.00

\*Includes electronic gas-sensing technology.

Series	Max No. of Irons	Flow Rates (Free-Blowing) 60 Hz CFM	Max. Pressure 60 Hz InH2O	Noise Level 60 Hz dBA	Power Consum. kW	Max. Weight (Net) lb	Inlet Port Dia.	Max. Duct Run
T-080	4-8	30	49	55	0.5	41.8	40 mm	N/A
T-150	5-15	53	68	59	0.8	70.4	40 mm	N/A

## AIRIDUS TK-1 1-Bench Push-Fit Ducting Kit

Includes: (2) 32-mm x 2.5-m ducting pipes, 32-mm tee, (3) 32-mm in-line couplings, (3) 32-mm 90° elbows, 32-mm 45° elbow, 32-mm end blank, (3) 32-mm pipe clips, 6 long tie wraps, 1/4" BSP connector, and #8 12.7-mm-long CSK head

P/N	Description	Each
TK-1	Ducting kit	\$47.75

## OK INDUSTRIES Bench-Top Fume Adsorbers

- Aerodynamic hood design effectively draws irritating soldering fumes away from the work area
- Carbon-impregnated filters trap 80% of the flux fumes
- Compact size, low profile, and adjustable stand allows convenient placement, 6" to 8" (152 mm to 203 mm) from work area (iron sold separately)



SA-9-115

P/N	Description	Each
SA-9-115	Bench-top fume adsorber	\$105.00
SA-9-E-115	ESD-safe bench-top fume adsorber with 3 filters	135.00
SA-91	Fume adsorber with articulating arm (not shown)	225.00
SA-91-E	ESD-safe fume adsorber with articulating arm (not shown)	250.00
SAF-1	Replacement filters, 3 pieces	18.80
SAK-90	Articulating arm mounting kit	119.00

## WELLER® Fume Extractor

Inhaling soldering fumes is unpleasant, plus it's unhealthy and against OSHA regulations. The WFE2P cuts down on worker's comp claims and creates a cleaner, safer work environment.

- Small, portable, extremely quiet unit, designed to clean fumes from up to 2 fume-extraction irons
- Electrically-driven, durable, sound-isolated vacuum pump
- Connection to 120 V AC 60 Hz
- The compact multistage filter consists of a submicron and gas filter (50% active carbon and 50% PURAFIL®)
- The highly efficient filter system allows the cleaned air to be recirculated into the work environment
- Self-contained system



WFE2P

P/N	Description	Each
WFE2P	Fume extractor (1 or 2 fume-extraction irons)	\$692.70
WFE20	Fume extractor (up to 20 fume-extraction irons)	3431.10

## EDSYN LONER Soldering Station with Fume-Extraction System

This is a cost-effective solution for single-user tip fume extraction.

- Requires clean and dry shop air, 60 psi-90 psi
- 3-stage filtration system effectively removes fumes at the source
- Retrofits to standard soldering or hot-air stations with optional conversion kits
- Accepts a wide variety of general-purpose tips
- Includes: 971 soldering station with fume-extraction system and LT375 soldering tip; tool pod; sponge holder with cleaning sponge, pad, liner; vacuum system; pod air switch; low-static silicone hose (1/8" ID); and a set of 10 clips for power cord/hose attachment



971FX

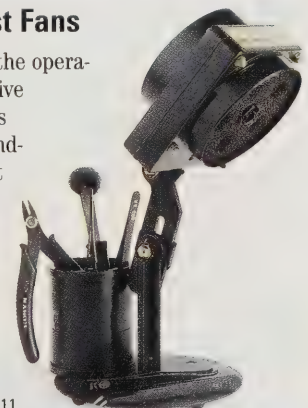
Power Requirements	120 V, 60 Hz
Power Rating	15 W-220 W
Heater Rating	120 V, 95 W
Temperature Range	400 °F-800 °F (205 °C-427 °C)
Temperature Regulation	±6°/±3°
Tip-To-Ground Voltage Leakage Resistance	<2 mV/<2 Ω

P/N	Description	1-5	6+
971FX	Temperature-controlled soldering station	\$499.10	\$419.15

## EDSYN Bench-Top Fume Exhaust Fans

These 2 products are designed to help make the operator's work area a healthier and more productive place to be by removing potentially hazardous fumes. Both products feature the same fan-and-filter setup. The FXF12 includes a convenient sponge holder and tip-storage tray.

- High performance
- Quiet air filtration
- Small footprint
- Static safe
- New dual-stage filtration system
- Front (green) and rear (yellow) LEDs to indicate airflow direction
- Adjustable height
- Adjustable 270° tilt



FXF11

P/N	Description	1-5	6+
FXF11	Bench-top fume-extractor fan	\$125.35	\$94.95
FXF12	Bench-top fume-extractor fan with sponger holder and tip-storage tray	135.25	113.60



## WILLSON® SANTA CRUZ® Spectacles

SANTA CRUZ makes stylish eye protection. Their spectacles have large, one-piece, wraparound polycarbonate lenses with frames that are available in a variety of bright, rich colors.

- Superior lens optics • Very comfortable • Easy temple adjustments • Lightweight
- Impact resistant

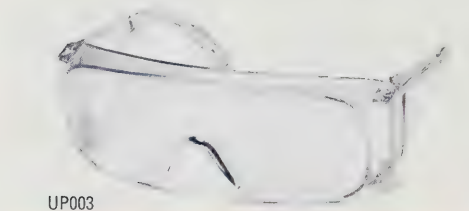


P/N	Description	1	2-9	10+
9600	Black frame, clear lens	\$5.95	\$5.35	\$5.20
9601	Blue frame, clear lens	5.95	5.35	5.20
9604	Burgundy frame, clear lens	5.95	5.35	5.20
9605	Yellow/black frame, clear lens	5.95	5.35	5.20

## WILLSON POLYSAFE® Eyewear

The POLYSAFE features a unique 4-way temple adjustment that assures a comfortable fit and clear undistorted vision regardless of facial configuration or head size.

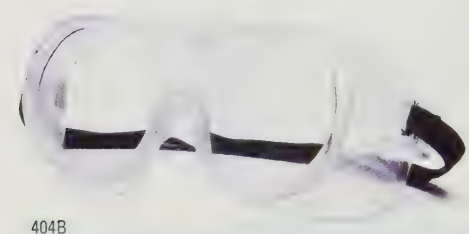
- 99% UV protection • Fits over prescription spectacles • Meet ANSI Z87-1-1989 Standards



P/N	Description	1	2-9	10+
UP003	Clear frame, clear lens	\$1.70	\$1.60	\$1.55

## WILLSON VUE-GUARD® Safety Goggles

- Polycarbonate clear lens provides impact resistance • Pliable plastic frame fits most facial contours comfortably • Can be worn over most prescription glasses • Lightweight



P/N	Description	1	2-9	10+
404B	Safety goggles	\$2.40	\$2.35	\$2.20

## WILLSON GLENEAGLE® Spectacles

GLENEAGLE classic spectacles protect the eye orbit. Their large 66-mm lenses provide full protection at the front; special forehead-hugging contouring provides protection at the top; and large wraparound side-shields provide protection at the sides.

- Lightweight and comfortable • Durable • Heat- and chemical-resistant • Adjustable temples
- Non-slip fit • Replaceable scratch-resistant lenses



P/N	Description	1	2-9	10+
6020	Black frame, clear lens	\$6.95	\$6.25	\$6.10
1844	Replacement lens	3.55	3.20	3.10

## BILSOM® WARRIOR™ Earmuffs

The WARRIOR is designed to meet the environmental, physical, and economic needs of industry.

- Lightweight
- 3 wearing positions
- Dielectric safety • Easy-to-replace snap-in cushions • NRR23



P/N	Description	1	2-9	10+
B2424	Earmuffs	\$8.75	\$8.30	\$7.90
B2312	Replacement-cushion kit	5.40	4.90	4.75

## BILSOM 727 Earmuffs

The BILSOM 727 allows you to lock in the perfect position for your maximum comfort and protection.

- At only 195 g, it is one of the lightest products on the market • Soft, wide cushion
- Low pressure
- Lightweight
- Padded headband • Very comfortable • 4-point alignment



P/N	Description	1	2-9	10+
B2727-00	Earmuffs	\$14.45	\$13.75	\$13.10

## WILLSON PREVAIL™ Safety Glasses

The PREVAIL safety glasses feature a new wrap-around sports-style frame.

- Meet ANSI Z87-1-1989 Standards • Side-impact protection • Lightweight



P/N	Description	1	2-9	10+
6350	Black frame, clear lens	\$5.90	\$5.75	\$5.45
6352	Burgundy frame, clear lens	5.90	5.75	5.45

## BILSOM 300 Series Disposable Earplugs

The 300 Series plug is very comfortable and provides excellent attenuation of troublesome low-frequency (125 Hz–1,000 Hz) noise levels.

- Tapered soft foam • Excellent expansion and comfort • Highly visible color • NRR of 28 dB/A(L)



P/N	Description	1	2-9	10+
B303S-12	Small, 400 pair	\$46.55	\$41.90	\$40.65
B303L-12	Large, 400 pair	46.55	41.90	40.65
B304S-12	Small corded, 100 pair	25.00	22.50	21.85
B304L-12	Large corded, 100 pair	25.00	22.50	21.85

## 3M Earmuffs

- Comfort and quality at an affordable price
- Multiposition ear cup for greater comfort and fit
- Lightweight design (7.5 oz) • Soft, sealing cushions offer excellent fit and comfort • Noise-reduction rating: 23 dB • Replacement-parts kit includes: 1 pair of ear cushions and 1 pair of molded noise-suppression inserts



P/N	Description	Each
1435	Earmuffs	\$14.50
1437	Replacement-parts kit	8.75



## ANSELL EDMONT SOL-VEX® Gloves

The tough nitrile compound used to make these gloves provides longer wear and better protection against abrasion, cuts, snags, and punctures than many other chemical-resistant gloves.

- Resist degradation • Resistance to strong chemicals • Fewer skin problems
- Embossed texture
- 15 mil, 13" length, straight cuff • Soft cotton-flock lining absorbs perspiration • Glove feels good on the hand • Goes on and comes off easily • 12 pair/package



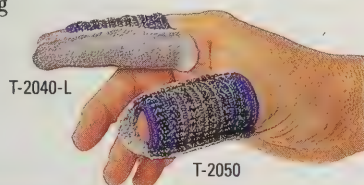
37-175

P/N	Description	Package
37-175-7	SOL-VEX gloves, size 7	\$21.10
37-175-8	SOL-VEX gloves, size 8	21.10
37-175-9	SOL-VEX gloves, size 9	21.10
37-175-10	SOL-VEX gloves, size 10	21.10

NOTE: Other sizes are available upon request.

## TAPES II Leather Finger and Thumb Guards

- Split-leather finger and thumb guards with elastic back • Long-lasting and economical material
- 50 per bag



P/N	Description	Each/Bag
T-2050	Leather thumb guards, one size fits all	\$19.95
T-2040-S	Small leather finger guards	19.95
T-2040-M	Medium leather finger guards	19.95
T-2040-L	Large leather finger guards	19.95

## Safety Tape Finger Wrap

- Excellent for abrasion protection and improved grip • Allows for better dexterity
- Protects yet breathes
- Replaces gloves in some applications • 16 rolls/package



040791

P/N	Description	Each
040791	Finger wrap, 3/4" x 30 yd	\$28.50

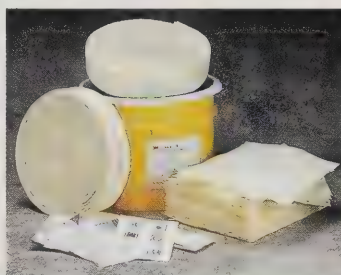
## 3M Chemical Sorbent-Folded Spill Kits

These spill kits are ideal for containing chemical spills in laboratories and in applications such as police and fire work as well as hazardous spill response. Chemical spill kits are available in 5-gal and 31-gal capacities. 3M's sorbent-folded can be used as booms, pillows, pads, or rolls.

5-gal kit includes: • 1 CHEMROLL, 5" x 26' with perforations every 16" • Temporary disposal bag and tie

31-gal kit includes: • 2 rolls chemical sorbent, 5" x 50', folded • 30 chemical sorbent pads • 3 temporary disposal bags and ties

- Yellow drum with lid and plastic closure ring

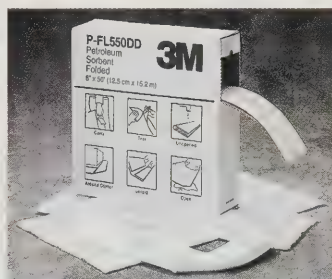


C-SKFL31

P/N	Description	Each
C-SKFL5	5-gal kit	\$87.80
C-SKFL31	31-gal kit	156.50

## 3M Sorbent-Folded

The handy dispenser box can be placed in areas where chemical spills are most likely to occur. 3M sorbent-folded can be used as pads, pillows, booms, or rolls, allowing you to stock fewer products to meet your sorbent needs. And with perforations every 16", you can select just the right length for the job.



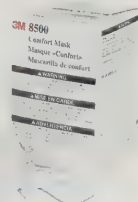
C-FL550DD

P/N	Description	Each
C-FL550DD	Sorbent, 5" x 50'/box	\$120.00

## 3M 8500 Comfort Mask

This "original" 3M mask provides relief from common nuisances. It is economical, comfortable, and lightweight. The 8500 is not a respirator, not government-certified, and not to be used when dust concentration is beyond permissible exposure levels.

- 50 masks per box 8500



P/N	Description	Each
8500	Face mask (filter), 50 masks per box	\$7.60

## Industrial First-Aid Kit

- Dressings: • 50 adhesive strips, 3/4" x 3" • 1 cotton ball, sterile • 2 gauze bandages, 2" • 1 combine dressing • 1 triangular bandage • 2 gauze pads, 4" • 4 gauze pads, 3" • 2 eye pads • 1 adhesive tape, 1/2" x 5 yd

Antiseptics: • 10 wound wipes • 3 ammonia inhalants • 1 first-aid/burn cream, 7/8 oz • 12 aspirin • 1 eye-irrigation solution, 1 oz

- Miscellaneous supplies: • 1 cold pack • 1 pair of scissors • 1 pair of tweezers • 1 instruction sheet



070002W

P/N	Description	Each
070002W	First-aid kit in metal case	\$31.70
070010W	First-aid kit in weather-proof, plastic case	27.25
070016W	Refill kit	19.50

## EVEREADY Industrial Safety Flashlights

These heavy-duty flashlights are manufactured in the U.S. They are UL Listed and tested by the Mine Safety and Health Administration for gas-air mixtures Class 1, Groups C and D.

The flashlights are built to withstand 5' drops to concrete. They have polypropylene housings that resist grease, oil, and gasoline; shatter-proof lenses; and wide switch to accommodate gloved hands.

- UL Listed • MSHA approved • Large switch with bump guard • Shatterproof lens • Ribbed nonslip grip • Nonconductive hanger ring • Individually boxed • Lifetime warranty



1259

P/N	Description	Each
1259	Flashlight, 2 D-cell model	\$7.20
1359	Flashlight, 3 D-cell model	7.90
PR6FP	Replacement bulb for 1259	.45
PR7FP	Replacement bulb for 1359	.45

## EVEREADY Super-Bright Magnet Flashlight

- Uses 2 D batteries • Krypton bulb • Chemical-resistant • Easy-slide switch • Faceted reflector • Anti-roll feature • Built-in magnet—adheres to any metal surface












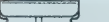
E251

P/N	Description	Each
E251	Super-bright magnet flashlight	\$5.00



## X-ACTO® Precision Knives and Blades

# X-ACTO®

Blades	Tuck Pack of 5 Blades		Bulk Pack of 100 Blades		No. 1		No. 1SGK		GRIPSTER		No. 2		No. 3 Pen		No. 5		No. 9RX	
					P/N	Each	P/N	Each	P/N	Each	P/N	Each	P/N	Each	P/N	Each	P/N	Each
	2	\$2.20	602	\$34.00	3001	\$3.15	3021	\$3.55	3623	\$4.50	3002	\$4.65	3003	\$5.40	3005	\$5.60	3009	\$9.95
	9	6.75	209*	6.75														
	10	3.30	610	55.00														
	11	2.10	611	27.00														
	—	—	511**	114.25														
	16	2.10	616	27.00														
	17	2.10	617	33.00														
	18	2.30	618	36.50														
	22	4.05	622	57.00														
	270	2.00	670	14.50														

\*Package of 5, carded. \*\*Bulk pack of 500.

### No. 1 Knife

• 4-7/8" aluminum handle with No. 11 blade for delicate precision cutting of light-weight materials

### No. 1 SGK Knife

• 4-7/8" aluminum handle with No. 11 blade for delicate precision cutting • Includes: translucent-plastic guard for safety and hexagonal chuck to prevent rolling

### GRIPSTER™ Knife

• Soft, rubberized barrel for comfort and control  
• Antiroll design for use on slanted surfaces  
• Includes: No. 11 blade for light-weight cutting

### No. 2 Knife

• 5" aluminum handle with No. 2 blade for precision cutting of medium- to heavy-weight materials

### No. 3 Pen Knife

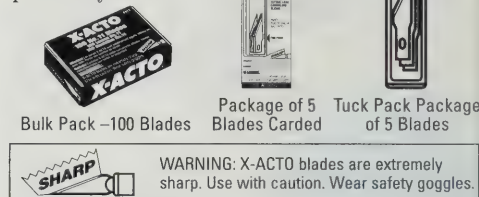
• Cuts light-weight materials • Includes: No. 10 blade and screw-on clear-plastic cap with pocket clip

### No. 5 Knife

• 4-1/4" plastic handle with No. 19 blade for precise, heavy pressure cutting of wood, mat board, cardboard, paper, plastic, metal, and foam board  
• Contoured handle for sure grip

### No. 9RX Knife

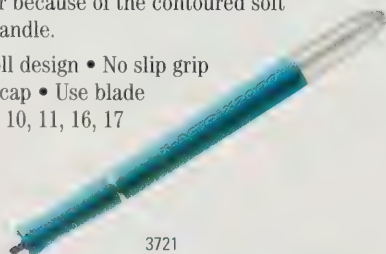
• For cutting lightweight materials like film, stencils, paper, and cloth • Includes: retractable positive-lock blade and pocket clip for portability



## X-ACTO X2000 Knives

The X2000 knives are more comfortable to use than any other knives on the market. They are also safer because of the contoured soft rubber handle.

• Anti-roll design • No slip grip  
• Safety cap • Use blade numbers 10, 11, 16, 17



3721

P/N	Description	1-10	11+
3721	Teal knife with safety cap	\$5.50	\$4.20
3722	Cranberry knife with safety cap	5.50	4.20
3723	Royal blue knife with safety cap	5.50	4.20
3724	Black knife with safety cap	5.50	4.20

## X-ACTO Standard Knife Set

This set is for general cutting and sawing of light-to medium-weight materials. The 3 knives and 17 blades provide extensive cutting and sawing capabilities.

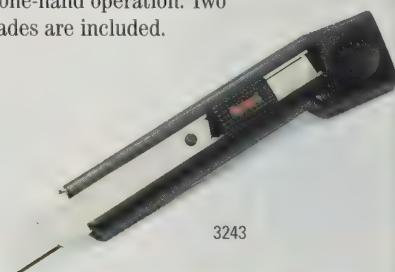


5083

P/N	Description	1-10	11+
5083	3-knife, 17-blade set	\$30.50	\$22.90

## X-ACTO Heavy-Duty Snap-Off-Blade Utility Knife

Sharpness is a snap away. The 8-section blade snaps off to provide 8 separate sharp edges for heavy-duty cutting of packages, canvas, one-hand operation. Two extra blades are included.



3243

P/N	Description	1-10	11+
3243	8-section utility knife	\$8.50	\$6.40
243	Replacement blades, 5/pkg	3.15	2.40



## MARSHALL 101 Standard Knife

Manufactured for us in the USA by PROEDGE.



P/N	Description	Each
101	MARSHALL knife	\$ .95
01110	#11 blade, 5-pack	1.25
05110	#11 blade, 100 per box	18.25

## WISS Utility Knife with Retractable Blade

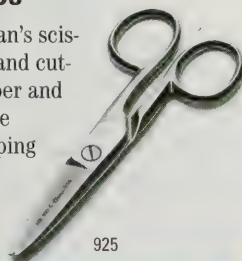
• Popular all-purpose knife • 4 blade positions • Easy-run slide uses all WISS RWK replacement blades • Handle designed for maximum comfort, painted COOPER red for easy visibility • Comes with 3 blades



P/N	Description	1-11	12+
WK-1A	Utility knife	\$5.00	\$3.75
RWK-12A	Heavy-duty replacement blades, 5 per pkg.	1.65	1.50

## CLAUSS 925 Series

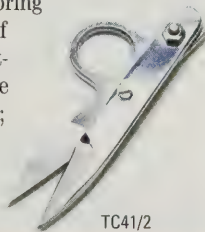
• Multipurpose electrician's scissors • For splicing wire and cutting harness ties • Scraper and file on back edge of blade • 925C comes with stripping notches for 19-AWG and 23-AWG wire • Length of cut: 1-3/4"



P/N	Description	Each
925	Without stripping notches	\$14.65
925C	With stripping notches	16.50

## CLAUSS Clippers

• Convenient quick-action spring return for rapid, short cuts of thread, string, paper, or light-gauge wires • TC41/2 is made from hot-forged cutlery steel; precision-ground and double-plated for durability; can be resharpened for an extended life



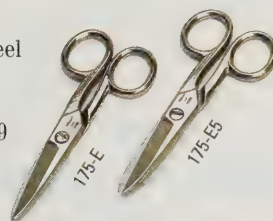
P/N	Description	Each
TC41/2	4-1/2" clippers	\$10.35

We are a full-service distributor with a broad range of the best products.

We provide reduced pricing on large-quantity orders.

## WISS Solid-Steel Electrician's Scissors

• Drop-forged hot steel • Fully nickel-plated • 175-E5 features a stripping notch for 19 AWG and 23 AWG wire • Scraper and file on back



P/N	Description	1-11	12+
175-E	5" electrician scissor	\$19.25	\$14.50
175-E5	5" scissor with stripping notches	19.25	14.50

## XCELITE SEIZERS® Forceps

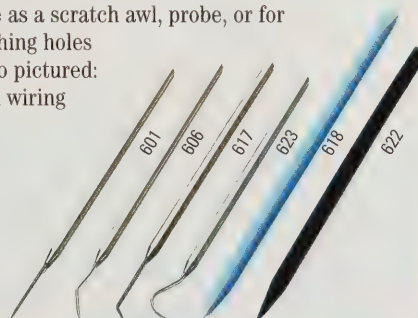
• Clamps firmly to hold wires for soldering • Acts as a heat sink • Retrieves small parts from hard-to-reach places • 3-position snap lock and box-joint construction



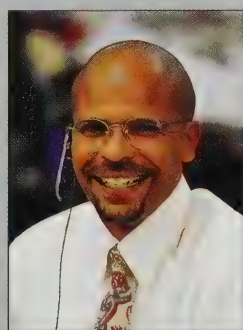
P/N	Description	1-11	12+
32H	Straight-nose jr. forceps, smooth jaws, 5"	\$11.85	\$10.55
33H	Curved-nose jr. forceps, smooth jaws, 5"	11.85	10.55

## DESCO Probes

• Hardened, chromed, tool-steel end • Use as a scratch awl, probe, or for punching holes • Also pictured: nylon wiring tools



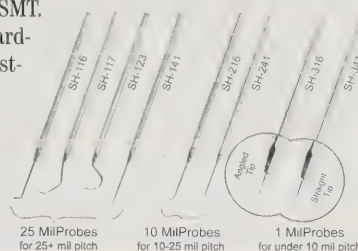
P/N	Description	1-10	11+
601	Straight probe	\$1.85	\$1.50
606	Hooked probe	1.85	1.50
617	Angle probe	1.85	1.50
623	Curved probe	1.85	1.50
618	Nylon screwdriver	1.55	1.25
622	Nylon point	SAVE List: 4.50	Each: 1.00
630	Probe kit, includes: 601, 606, 617, 623	9.90	7.90



If You Don't See What You Need, Just Call.

## BEAU TECH MilProbes Series

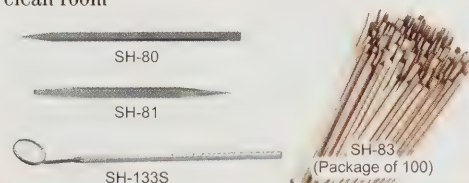
The only complete line of stainless-steel probes for TH and SMT. Specially hardened, longest-lasting tips. Dull finish on handle and tip reduces glare.



P/N	Description	1-10	11+
SH-116	25-mil probe, 1/4", 50°-angle	\$1.85	\$1.50
SH-117	25-mil probe, double-bent	1.85	1.50
SH-123	25-mil probe, curled	1.85	1.50
SH-141	25-mil probe, straight	1.85	1.50
SH-216	10-mil probe, 1/4", 50°-angle	6.90	5.95
SH-241	10-mil probe, straight	6.90	5.95
SH-316	1-mil probe, 0.005", 50°-angle	14.95	13.95
SH-341	1-mil probe, straight	14.95	13.95

## BEAU TECH Spudgers, Orange Sticks, Inspection Mirror

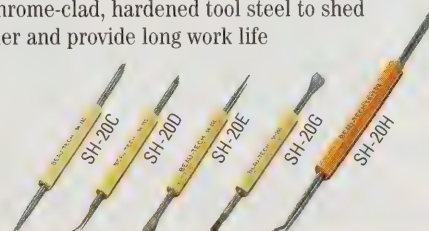
• Static-free tools to bend leads, position components, and break solder bridges • Spudgers are mechanically strong and heat resistant in excess of iron temperatures • Orange sticks are inexpensive alternatives—no resins or finish to contaminate solder • Stainless-steel framed mirror for clean room



P/N	Description	1-10	11+
SH-80	Flat spudger, 6" x 1/4"	\$4.35	\$3.35
SH-81	Round spudger, 5-1/2" x 5/16"	4.60	3.50
SH-83	Orange sticks, 7" x 5/32", 100/pack	12.95	9.95
SH-133S	Mirror, 7/8" head	4.80	3.80

## BEAU TECH Soldering Aids

• Chrome-clad, hardened tool steel to shed solder and provide long work life

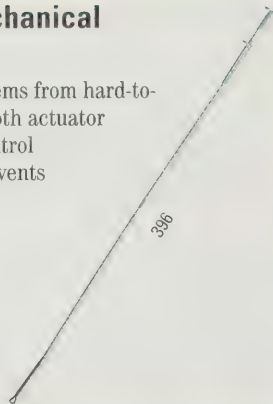


P/N	Description	1-10	11+
SH-20C	Straight-flat reamer/straight-fork tip, 5-1/2"	\$3.55	\$2.70
SH-20D	Angled flat reamer/straight-fork tip, 5-1/2"	3.55	2.70
SH-20E	Straight flat reamer/beveled scraper blade, 5-1/2"	3.55	2.70
SH-20G	Stainless-steel brush/beveled scraper blade, 5-1/2"	3.60	2.85
SH-20H	Hook/straight-fork tip, 8"	3.60	2.85



## GENERAL Mechanical Pick-Up

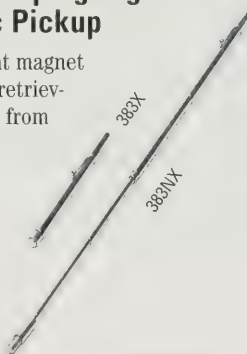
- Retrieves small items from hard-to-reach places • Smooth actuator provides greater control
- Chrome finish prevents rust • 23-1/2" reach



P/N	Description	1-10	11+
396	Mechanical pick-up	\$7.10	\$6.50

## GENERAL® Telescoping High-Power Magnetic Pickup

- A powerful permanent magnet pickup tool • Ideal for retrieving steel and iron parts from hard-to-reach places
- Magnet is fitted in a 5-1/2"-long nickel-plated steel handle that extends up to 23-1/2"



P/N	Description	1-10	11+
383X	6-oz pull magnetic pickup	\$6.35	\$5.80
383NX	2-lb pull magnetic pickup	6.85	6.30

## GENERAL LEXAN Inspection Mirror

- For inspecting hard-to-reach places • Crack-resistant LEXAN • Plated body prevents rust
- Made in USA



P/N	Description	1-10	11+
575	1-1/4" diam., 8" (L)	\$6.15	\$5.65
577	2-1/4" diam., 10-1/2" (L), extends to 15"	8.75	8.00
578	Oval, 1" x 2", 9" (L)	6.75	6.40

## Orange Sticks

- Inexpensive versatile tool to break bridges and bend or position components
- 100 sticks per box



P/N	Size	Per Pack	1	2-8	9+
OS-100	7" (L) x 5/32"	100	\$4.25	\$4.00	\$3.70
OS-100-2	7" (L) x 3/16"	100	4.70	4.25	3.90

## NATIONAL NOVELTY Acid Brushes

- Constructed with natural horsehair fibers (horsehair is non-ESD generating)
- 144 brushes per box



P/N	Width	Overall Length	Per Box
1	3/8"	6"	\$7.70
2	1/2"	6"	9.35

## TECH SPRAY Brushes

- Excellent for cleaning and applying chemicals
- Brushes range from stiff-bristle brushes for heavy scrubbing to soft-bristle brushes for sensitive cleaning



P/N	Description	Each
2020-1	7-3/4" wood handle with horsehair bristle	\$2.05
2021-1	7-3/4" wood handle with hog bristle	2.90
2022-1	8-3/8" wood handle with hog bristle	5.95
2023-1	7-3/16" poly handle with horsehair bristle	3.10

## TECH SPRAY Brushes




P/N	Description	Each
2025-1	7-3/4" wood laminated handle, .003" brass bristle	\$6.15
2026-1	10-3/16" wood handle, horsehair bristle	8.80
2027-1	5" wood handle, hog bristle	4.70
2028-1	7-3/4" wood laminated handle, .006" stainless-steel bristle	3.50


## TECH SPRAY Brushes



P/N	Description	Each
2030-1	3-1/2" stainless-steel handle, goat-hair bristles	\$4.95
2031-1	4-1/2" stainless-steel handle, horsehair bristle	5.30
2032-1	4-1/2" plated-steel handle, horsehair bristle	5.05
2033-1	4-1/2" plated-steel handle, horsehair bristle	3.95

.....

 **New Product:** This symbol represents the industry's latest offerings.

 **We provide reduced pricing on large-quantity orders.**

## R&R™ I.C. Lotion and Hand Cleaner

### I.C. Lotion

- Static dissipation helps keep skin moist for better contact with a wrist strap • Noncontaminating—no glycerin, mineral oil, silicone, or lanolin
- Absorbs immediately and is completely non-greasy—won't interfere with grip and dexterity
- Relieves chapping and irritation caused by the repeated use of rubber gloves and finger cots and frequent hand washing

### I.C. Hand Cleaner

This is a natural, mildly-cationic hand cleaner formulated specially for the electronics industry. Ordinary hand cleaners contain soaps which are derivatives of animal and vegetable fats. These fatty materials, along with silicone, lanolin, and mineral oil can cause contamination which may adversely affect solderability.

- 100% organic • No soap • No lanolin • No silicone • No mineral oil • Nonacidic • No salt



P/N	Description	1-24	25-72	73+
IC-Lotion-80Z	8-oz bottle	\$3.00	\$2.80	\$2.60
IC-Lotion-80Z-ESD	8-oz ESD-safe bottle	4.75	4.40	4.10
IC-Lotion-QT	1-qt bottle	11.70	10.80	10.00
IC-Lotion-GAL	1-gal container	35.85	33.10	30.75
IC-Handcleaner-QT	1-qt bottle	8.35	7.70	7.15
IC-Handcleaner-GAL	1-gal container	24.45	22.55	20.95
Wall-BR-32	Bracket for 1-qt bottle	21.00	—	—

## CHEMTRONICS STATIC FREE™ HAND GUARD™

This hand lotion protects against electrostatic discharge.

- Nongreasy formula contains aloe vera and vitamin E • Contains no lanolin, silicone, or mineral oil that could inhibit the solderability of printed circuits or components • Moistens and refreshes dry, chapped, or chemically-irritated skin



C805

P/N	Description	1-24	25-48	49+
C805	8 oz, liquid	\$5.25	\$4.95	\$4.65
P/N	Description	1-3	4-6	7+
C105	1 gal, liquid	\$52.25	\$48.25	\$44.80



## ANSELL EDMONT TOUCH N TUFF™ Nitrile Gloves

TOUCH N TUFF gloves are made of 100% nitrile. They have no fillers or additives, such as wax, silicone, or plasticizers, that can contaminate your product. The nitrile compound used in these gloves offers a high level of resistance to nicks, cuts, and abrasions and offers superior splash protection against irritating chemicals. These gloves provide 3 times the puncture resistance when tested against competing natural-latex and vinyl gloves. They are available in 2 versions: powder-free for critical applications or lightly powdered for less critical ones.

- 4 mil, 9-1/2" length, rolled cuff • Ambidextrous • Teal color • 100 gloves/dispenser-box
- Disposable

92-500/92-600



P/N	Description	Each
92-500-S	NITRILE, powdered gloves, size 6-1/2 to 7	\$13.00
92-500-M	NITRILE, powdered gloves, size 7-1/2 to 8	13.00
92-500-L	NITRILE, powdered gloves, size 8-1/2 to 9	13.00
92-600-S	NITRILE, powder-free gloves, size 6-1/2 to 7	14.90
92-600-M	NITRILE, powder-free gloves, size 7-1/2 to 8	14.90
92-600-L	NITRILE, powder-free gloves, size 8-1/2 to 9	14.90

## ANSELL EDMONT CONFORM Gloves

CONFORM gloves are MADE OF 100% natural rubber latex for better protection against pinholes.

- White, 5-mil, powder free, 9-1/2" gloves • Ambidextrous
- Rolled cuff • Natural latex • Smooth finish
- 100 gloves/box
- Disposable

69-105



P/N	Description	Each
69-105-S	Small, white, natural-latex gloves	\$11.50
69-105-M	Medium, white, natural-latex gloves	11.50
69-105-L	Large, white, natural-latex gloves	11.50

## GOLDEN NEEDLES Low-Linting Nylon Stretch Gloves

These low-linting 100%-nylon stretch gloves are ergonomically engineered for use in manufacturing, inspection, and material-handling applications that require optimum tactile sensitivity and freedom of movement. Made of white, continuous-filament, fine-denier nylon and knitted in a seamless con-

112NF

112



## OAK Vinyl Gloves

OAK INDUSTRIAL HANDIES® vinyl gloves are designed to provide hand protection and dexterity for tough applications. Because these gloves provide safety and sensitivity, they can replace expensive latex gloves in many applications—at a significant cost savings. These gloves are conveniently packaged 100 gloves per dispenser box.

- Powder-free • Nonallergenic • Formulated for extended service life • Reusable • Ambidextrous—3 sizes assure proper fit • 2 thicknesses available: standard weight (.006") or heavyweight (.0065")



96-249

96-279

P/N	Description	1-4	5-9	10+
96-179	Standard weight, small	\$12.20	\$11.25	\$10.45
96-279	Standard weight, medium	12.20	11.25	10.45
96-379	Standard weight, large/x-large	12.20	11.25	10.45
96-149	Heavy weight, small	18.75	17.35	16.10
96-249	Heavy weight, medium	18.75	17.35	16.10
96-349	Heavy weight, large/x-large	18.75	17.35	16.10

## CLEAN ESD COTTON Gloves

- Lightweight and flexible • Tough and durable 100% cotton-knit lisle • Excellent as general-purpose glove or liner • 12 pair per bag



42W

P/N	Description	List	Per Bag
42W	9" women's size, lightweight cotton lisle	\$4.45	\$3.10
43M	9" men's size, lightweight cotton lisle	4.45	3.10

struction. These gloves offer all the advantages of stretch gloves without the use of latex.

- Low-linting and shrink-resistant • Full-fingered and half-fingered styles • 12 pair/bag

P/N	Description	Each
112-S	Full-fingered glove, small	\$18.15
112-M	Full-fingered glove, medium	18.15
112-L	Full-fingered glove, large	18.15
112-XL	Full-fingered glove, x-large	18.15
112NF-S	Half-fingered glove, small	21.45
112NF-M	Half-fingered glove, medium	21.45
112NF-L	Half-fingered glove, large	21.45
112NF-XL	Half-fingered glove, x-large	21.45

## SOLON Cotton-Tip Applicators

Cotton-tip applicators are ideal for clean-room, industrial, audio-visual, optics, electronics, and general-cleaning applications. They come in a 10-pack case, 100 applicators per pack.

361-WC

Cotton-Tipped Applicators



362-WC

P/N	Description	Each
361-WC	3" cotton-tip applicators, wood, 1,000	\$5.35
362-WC	6" cotton-tip applicators, wood, 1,000	5.80

## SOLON Tongue Depressors

- High-quality wood soldering aid
- 500 per box



320EC

P/N	Description	Each
320EC	6" x 11/16" tongue depressor	\$4.75

## CHEMTRONICS Swabs and Applicators

CC15

CX50

CFP10

CT100

CT200

**FOAMTIPS™ Pro:** • Double-ended swabs (blue scrubber end and a soft absorbent end) • Flexible 6" polypropylene handle

**CHAMOIS TIPS™:** • For cleaning magnetic heads of VCRs, audio recorders, and other A/V equipment • Tips are made of super-clean material and do not have fibers or particulates as do cotton wipes

**FLEXTIPS™:** • Flexible foam head is ideal for cleaning optics and small confined areas

**COTTONTIPS™:** • Economical swabs designed for general-cleaning applications and fast absorption of solvents

P/N	Description	Each
CFP10	FOAMTIPS Pro, 10 per pack	\$6.10
CC15	CHAMOIS TIPS, 15 per pack	8.80
CX50	FLEXTIPS, 50 per pack	19.05
CT100	COTTONTIPS, 100 per pack	2.65
CT200	COTTONTIPS, double-headed, 100 per pack	2.75



**CHEMTRONICS CHEMPAD™**

• Removes dirt, oxide build-up, oil, and other contaminants from tape heads, capstan rollers, guides, and transport mechanisms • Recommended for cleaning dirt, grease, and flux from PCB's, components, mechanical/electrical assemblies, and other electronic equipment



CP400

P/N	Description	Each
CP400	Chempad, 50 per pack	\$16.65

**CHEMTRONICS GOLD GUARD™ 2000 Pad**

• Cleans, lubricates, and protects gold fingers and other metal contacts • Lint-free pads gently clean and protect micro-thin gold fingers and other precious-metal contacts



CP420E

P/N	Description	Each
CP420E	Gold Guard 2000 pad, 50 per pack	\$29.20

**CHEMTRONICS SCREEN PREP™**

• Wet-and-dry-cleaning system • Provides a static-dissipative treatment with wet pad • Safely removes dust, dirt, and oils • Controls static-generated dust • Dry pad wipes monitor screens optically clear



CSP20

P/N	Description	Each
CSP20	1 pad (3" x 4") and 1 pad (4" x 6") per twin-pack, 25 twin-packs	\$17.90

**CHEMTRONICS CHEMSWAB™**

• Evaporates quickly leaving no residue or contamination • Nonabrasive swab presaturated with ultra-pure IPA • Features an elongated-foam-head applicator for easy access into hard-to-reach areas • Safely cleans keys on computer keyboards, magnetic-tape devices, and electronic components



CS25

P/N	Description	Each
CS25	Urethane-foam swab, presaturated with IPA, 25 per box	\$20.95

**TECH SPRAY Swabs and Applicators**

TECHSWABS™ are precisely designed, manufactured, and packaged to serve the various cleaning and maintenance needs of the electronics industry. They are packaged in a Class-100 clean room in static-dissipative resealable bags that control both electrostatic discharge and contamination.

FOAMTIPS have 100 pores per inch of reticulated polyurethane foam, which ensures excellent absorbency while minimizing contamination. Since the tips are heat sealed to the handle, tip loss is prevented—even when they are saturated with solvent.

COTTONTIPS are tightly wrapped with pre-cleaned cotton to ensure the least amount of extractable contaminants. The wooden handle of the 2300 allows for aggressive cleaning, while the pointed tip of the 2313 allows for precision cleaning.



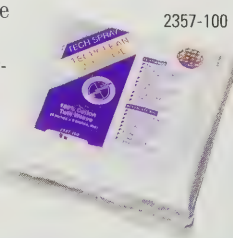
2313-30 2300-100 2302-50

P/N	Description	Each
2302-50	FOAMTIPS, polypropylene handles, 50 per pack	\$9.70
2300-100	COTTONTIPS, double-ended, 100 per pack	2.80
2313-30	COTTONTIPS, double-ended, pointed, 30 per pack	4.45

**TECH SPRAY TECHCLEAN® Twill Wipe**

This wipe is a 100%-cotton twill-weave product designed for wiping abrasive surfaces to dislodge soils. Since it's woven from cotton, it can be used in static-sensitive areas. The wipe is cut on the bias (45° angle) to prevent raveling.

• Use for: static-sensitive applications, dislodging heavy soils, high-temperature areas, clean-room applications, cleaning and burnishing, acid removal, spillage cleaning, wiping abrasive surfaces



2357-100

P/N	Description	Each
2357-100	6" x 6" flat wipes, 100/pkg. bag n' bag	\$15.25

**TECH SPRAY Tech Dauber**

This is a convenient dispensing unit for spot-cleaning applications where accuracy is a must. The refillable 2-oz bottle comes with a porous, sponge-like applicator that dispenses small amounts of solvent when applied to a surface. The unit fits easily into crowded work areas and toolboxes. It is excellent for rework and repair stations. The dispenser complies with EPA recommendations for "not-in-kind" cleaning alternatives.



1985

P/N	Description	Each
1985	2-oz bottle with applicator tip	\$4.15

**KIMBERLY CLARK KIMWIPES® and KAYDRY® Wipers**

• For wiping delicate surfaces, glass, PLEXIGLAS, highly-polished metal, plastic, delicate scientific and electronic equipment, and inspection areas • Wiper fibers are steamed, then bleached clean to eliminate contamination • Under normal use, will not deposit chemicals or bacterial contamination on sensitive surfaces



34256

34155

P/N	Description	Per Case	Case
34155	KIMWIPES, 4-1/2" x 8-1/2"	60 boxes	\$90.00
34256	KIMWIPES, 15" x 17"	15 boxes	65.00
34721	KAYDRY, 15" x 17"	15 boxes	90.00

**WELLER Flux Dispenser and SCRUB-IT™**

• Eliminates spills and waste • Perfect for solder/desolder work • Self-standing, nonspill, holds 2 oz • Polyethylene bottle compatible with all common solvents • SD-74 has a long-lasting stiff-nylon-bristle brush • SD-74H has a horse-hair brush for antistatic operations



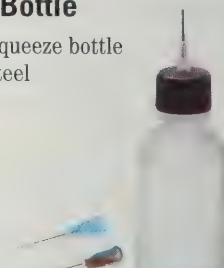
FD-2

SD74

P/N	Description	1-11	12+
FD-2	Bottle with .020" needle	\$3.00	\$9.95
FD-21	Bottle with .010" needle (not shown)	2.35	2.10
FD-21D	Static-dissipative bottle with .010" needle (not shown)	3.05	2.75
SD74	SCRUB IT nylon-bristle brush, bottle	7.95	7.10
SD74H	SCRUB IT horsehair-bristle brush, bottle (not shown)	7.95	7.10

**KAHNETICS Flux Bottle**

This standard 2-oz flux squeeze bottle comes with 3 stainless-steel 1/2"-long needles: 18 ga, 22 ga, and 25 ga.



KDS-5200LL-3

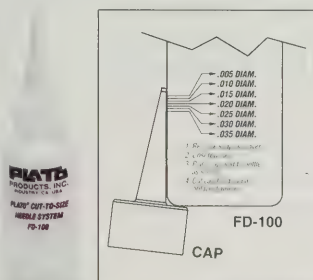
P/N	Description	Each
KDS-5200LL-3	Flux squeeze bottle	\$1.40



## PLATO Flux and Liquid Dispensers

These new POS-A-LOC® dispensers have a leak-proof double seal. The ESD-safe flux bottles meet the requirements of MIL-STD-2000.

• The FD-100 cut-to-size dispenser tip lets you decide which opening best meets your needs



P/N	Description	Each
FD-006	2 oz with .006" capillary ID	\$2.75
FD-100	Cut-to-size dispenser	2.75
FD-2	2 oz with .020" capillary ID	2.60
SF-02	Same as FD-2, only ESD-safe	5.35
FD-21	2 oz with .010" capillary ID	2.60
SF-01	Same as FD-21, only ESD-safe	5.35
BC-250	8-oz poly bottle with dispensing tube	4.15
SF-250	Same as BC-250, only ESD-safe	8.80

## PLATO Brush Scrub Bottles

These handy 2-oz polyethylene dispensers provide a quick and easy way to spot-clean PC boards. SF-B2HS and SF-B2HH are ESD-safe and meet MIL-STD-2000.

- Inexpensive • Unique control mechanism
- No dripping or waste



P/N	Description	Each
SB-2N	Nylon bristle, medium stiffness	\$8.15
SF-B2HS	Natural horsehair bristle, soft to medium stiffness, ESD safe	10.20
SF-B2HH	Natural hog bristle, medium to stiff, ESD safe	10.20

## MENDA Solvent Dispensers and ESD-Safe Sleeves

- Light pressure with a cloth or other applicator on the dispensing dish brings clean fluid to the surface
- Pump is fabricated from stainless steel to assure reliable service and resistance to harsh liquids
- CM-712 is designed to be portable
- Slip CM-302, CM-303 and CM-308 sleeves over an existing dispenser bottle to eliminate potential static
- Meets MIL SPEC MIL-B-81705B Type 2



P/N	Description	Each
CM-612	4-oz bottle	\$10.55
CM-612-Glass	4-oz glass bottle (not shown)	10.95
CM-613	6-oz bottle	10.75
CM-618	8-oz bottle	10.95
CM-620	4-oz metal container	12.95
CM-712	4-oz bottle, locking top	14.55
CM-302*	Fits 4-oz-bottle (CM-612)	3.55
CM-303*	Fits 6-oz-bottle (CM-613) and 4-oz-bottle (CM-712)	3.75
CM-308*	Fits 8-oz-bottle (CM-618)	3.95

\*NOTE: Order dispensers separately.

## MENDA FM-Approved Dispenser

This dispenser for flammable liquids, is safety-assured through rigorous FACTORY MUTUAL (FM) RESEARCH testing. Our FM-approved dispenser meets OSHA standards for flammable liquids and containers, and allows 1-handed access to flammable and other liquids.



P/N	Description	Each
3314FM	4-oz bottle with standard FM pump	\$11.20

## MENDA Static-Dissipative Bottles

The standard-pump model protects contents until used and dispenses only as much as needed. The purity-pump model protects against cross contamination by preventing fluid, once pumped out, from returning to dispenser.

- These semitransparent bottles feature measurement gratings for instant monitoring of fluid levels
- 1-touch operation
- No triboelectric charge
- Contain no silicones
- Comply with MIL-STD-81705B and NFPA Code 56A



P/N	Description	Each
3366	6-oz blue bottle with standard pump	\$11.20
3566	6-oz blue bottle with purity pump	13.15

## MENDA Twist-Lock Alcohol Dispenser

MENDA's twist-lock pump and HDPE dispenser are ideal for any aqueous or alcohol-based liquids and other nonaggressive solvents. The twist-lock dispenser eliminates direct hand contact, spillage, fumes, and waste in addition to protecting the liquid's purity.

- 1-touch operation
- Locks for leak-proof travel
- No stoppers or caps to remove
- Reduces fumes, odors, and evaporation
- Available in plain white bottle



P/N	Description	Each
3218A	8-oz Euro bottle with twist-lock top	\$4.65
3218	8-oz Euro bottle with twist-lock top, plain	3.45



Help is Just a Phone Call Away



## KAHNETICS Shot Meter

- Digital timer control for reproducibility • Vacuum feature prevents dripping • Foot-pedal actuated • Deluxe shot meter comes with accessory outlet for connection to external tank



KDS834A

**LIFETIME  
WARRANTY**

P/N	Description	Each
KDS834A	Shot meter with digital timer	\$655.00
KDS834A-D	Shot meter with deluxe kit	767.00
KDS824A	Shot meter with digital timer with accessory outlet	803.00
KDS824A-D	Shot meter with deluxe kit with accessory outlet	914.00
KDS3000	Shot meter with digital and programmable timer	1106.00
KDS808	Controller with vacuum (no timer)	468.00
KDS808-D	Controller with deluxe kit	584.00

NOTE: Accessory outlet allows external tank connection. Deluxe kit comes with starter accessories, including syringes, adapters, tips, needles, and more.

## KAHNETICS Foot Valve

- Basic on/off function • "Eyeball" accuracy • Regulator and gauge • Low cost, low maintenance • Deluxe starter kit: for users who are not sure what size syringes they will need



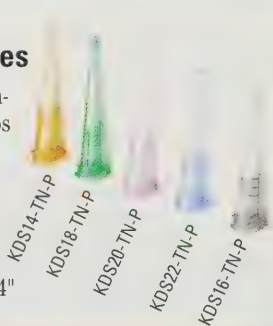
KDS806

**LIFETIME  
WARRANTY**

P/N	Description	Price
KDS806	Foot valve	\$197.00
KDS806D	Foot valve with deluxe starter kit	315.00
KDS806V	Foot valve with vacuum	280.00

## KAHNETICS Tapered Needles

- All-plastic (polyethylene) dispensing tips
- 5 different sizes
- Tapered design helps reduce dripping
- Prevents surface scratches
- Overall length 1-1/4"
- 50 needles per box



P/N	ID	Color	Per Box
KDS14-TN-P	.062"	Salmon	\$18.00
KDS16-TN-P	.047"	Gray	18.00
KDS18-TN-P	.033"	Green	18.00
KDS20-TN-P	.023"	Pink	18.00
KDS22-TN-P	.016"	Blue	18.00
KDS24-TN-P	.013"	Red	18.00

## KAHNETICS Needle Sample Kit

- Great for use on the production floor • Includes over 600 needles and tips of various sizes



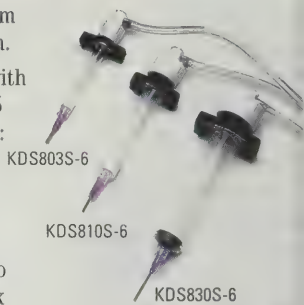
KDS660

P/N	Description	Each
KDS660	Needle sample kit	\$50.00

## KAHNETICS Air-Operated Universal Syringe Adapters

These adapters come in the original aluminum version or the new lightweight-plastic version.

- Fits any manufacturer's syringes • Works with LUER LOK or tapered-tip syringes (1 cc to 35 cc capacity) • Use with all types of materials: single component, 2-part, self-leveling, all viscosities, etc. • Produces very accurate, reproducible dispensed amounts when used with a shot meter with timer and vacuum
- Five sizes for handling syringes from 1 cc to 35 cc • Gasket seal in the adapter for no-leak operation—even at high pressures • Syringe not included • Adapter head only available or as assembly with 6-foot hose and male fitting.



### Original Aluminum Adapters

P/N	Description	Aluminum Adapters Only	With 6' Hose
KDS803S	Fit all 2-1/2-cc and 3-cc syringes	\$20.40	\$23.00
KDS805S	Fit all 5-cc and 6-cc syringes	20.40	23.00
KDS810S	Fit all 10-cc and 12-cc syringes	22.30	25.60
KDS830S	Fit all 30-cc and 35-cc syringes	22.30	25.60

NOTE: Add -6 to end of product number for adapter with 6' hose.

### Plastic Adapters

P/N	Description	Plastic Adapters Only	With 6' Hose
KDS503S	Fits all 2-1/2-cc and 3-cc syringes	\$16.00	\$18.50
KDS505S	Fits all 5-cc and 6-cc syringes	16.00	18.50
KDS510S	Fits all 10-cc and 12-cc syringes	17.70	19.60
KDS530S	Fits all 30-cc and 35-cc syringes	17.70	19.60

NOTE: Add -6 to end of product number for adapter with 6' hose.

## KAHNETICS Syringes

These syringes are packaged for ready access and quick assembly.

- "A" series: air-operated syringe, includes barrel and stopper • "M" series: manual syringe, includes barrel, stopper, and plunger rod



M50T

P/N	Qty/Bag	Capacity	With Rubber Stopper	With Plastic Stopper
A3LL	20	3 cc	\$6.00	\$9.20
A5LL	20	5 cc	9.20	12.90
A10LL	15	10 cc	10.00	10.60
A30LL	10	30 cc	8.40	9.30
A6T	20	6 cc	13.80	N/A
A30T	10	30 cc	8.50	N/A

NOTE: Add "PS" to end of part number for plastic stopper (only available for LL part numbers). Bulk syringe components are available.

P/N	Qty/Bag	Capacity	Assembled	Unassembled
M3LL	20	3 cc	\$9.10	\$7.70
M5LL	20	5 cc	12.60	13.20
M10LL	15	10 cc	10.30	11.80
M30LL	10	30 cc	13.10	11.00
M6T	20	6 cc	N/A	17.80
M30T	10	30 cc	N/A	12.00
M50T	5	50 cc	N/A	12.30

NOTE: Add -ASSM to end of part number for assembled (only available for LL part numbers). Bulk syringe components are available.

## KAHNETICS Stainless-Steel Pre-Packaged Needles

- Blunt plastic hub, stainless-steel shaft, non-sterile • Pre-packaged in boxes for convenience in handling, storage, and disbursement • Bulk needles available

The following products include 50 needles per box and are available in 1/2" and 1" lengths except 27 g which is available in 5/16" and 1".



Gauge	ID	OD	Hub Color	Each Box
14	.066"	.083"	Dark green	\$10.85
15	.060"	.072"	Orange	10.85
16	.053"	.065"	Purple	10.85
18	.038"	.050"	Pink	7.40
20	.026"	.036"	Yellow	7.40
21	.023"	.032"	Green	7.40
22	.020"	.028"	Black	7.40
25	.012"	.020"	Blue	7.40
27	.009"	.016"	Tan	8.70

P/N example: KDS18-1/2P (18 AWG needle, 1/2" long, prepackaged). Bulk packaging available (1000 qty.) Add "B" to end of product number instead of "P".



## BRANSON™ Ultrasonic Cleaners

Ultrasonic cleaning is the most efficient method for removing dirt, grease, oil, processing lubes, fluxes, and oxides from an endless variety of things. It cleans safely, effectively, and thoroughly in seconds—easily reaching hidden parts and cavities that cannot be reached by any other means. This method is a natural for cleaning today's small PC boards.

- Self-contained, portable • Simple operation • Electronic circuitry, self-tuning, virtually indestructible lead zirconate titanate transducer • Flammable solutions are not to be used in ultrasonic cleaners • No radio-frequency interference, no high-voltage spikes above 2.5 MHz • Stainless-steel tank
- Impact-resistant, durable outer shell made from easy-to-clean plastic
- Tank cover included with all models • 115 V, 50/60 Hz

The following products include a digital timer, heater, and temperature monitor.

P/N	Internal Tank Size (L x W x D)	Power	Capacity	Each
B1510DTH	5-1/2" x 6" x 4"	143 W	1/2 gal	\$394.00
B2510DTH	9-1/2" x 5-1/2" x 4"	239 W	3/4 gal	\$19.00
B3510DTH	11-1/2" x 6" x 6"	335 W	1-1/2 gal	\$803.00
B5510DTH	11-1/2" x 9-1/2" x 6"	469 W	2-1/2 gal	\$1028.00
B8510DTH	19-1/2" x 11" x 6"	881 W	5-1/2 gal	\$1797.00



We provide world-class quality ISO-9002-certified services and facilities.

Call for information on Ultrasonic Cleaner accessories

## BRANSON Ultrasonic-Cleaner Liquid



P/N	Description	Each Case
EC-GAL	Electronics cleaner for electrical contacts and leads, ceramic insulators and ceramic components	\$75.00
MC-1-gal	Metal cleaner removes oils, greases, and a wide variety of soils from aluminum, aluminum alloys, copper, brass, and steel	75.00
MC-2-gal	Metal cleaner removes oils, greases, and a wide variety of soils from ferrous metals, steel alloys, titanium alloys, copper, copper alloys, and stainless steel. Not recommended for aluminum or aluminum alloys	70.00
MC-3-gal	Metal cleaner removes oils, greases, and soils from ferrous metals, aluminum, copper, stainless steel, titanium, and copper alloys. It emulsifies the soils, them from preventing re-depositing	73.00

NOTE: 4 gallons per case. Also available in 5- and 55-gallon drums.

## 3M Electronics Vacuum

Since this unit is both powerful and highly efficient, it can be used to clean most business equipment. It comes with a stretch-hose (to 10') wand, crevice tool, crevice brush, dusting brush, and needle nozzle.

- 9 lb, 14 oz
- 3-year warranty



P/N	Description	1-5	6+
497AJM	Electronics vacuum	\$205.00	\$193.75
P/N	Description	1-12	13+
SV-MPF2	Replacement filter, Type II, medium particle	\$15.00	\$12.85

## 3M POLYGUN™ TC Applicator

This is a real workhorse that delivers JET-MELT™ adhesives quickly and economically. The convenient cartridge holder speeds reloading and features "touch control" with special nonfatiguing thumb operation and precise, even adhesive flow.

- 12-month warranty • Designed to be user-friendly • Great for use in electronics: tacking, mounting, unitizing, potting, coil terminating, encapsulating • Power: 150 W • Operating temperature: 390 °F
- Melt rate: 3.5 lb/hour with JET MELT 3748



P/N	Description	1	2+
POLYGUN-TC	Electric, with .090" tip	\$83.85	\$78.00
3748-TC	JET-MELT adhesive, 5/8" x 2", 11 lb/case,	150.70	131.45

## ELECTRIX™ Personal Comfort Volume Air Circulator

For today's workstation, ELECTRIX introduces a powerful and portable personal air circulator. These units require minimal space and operate very economically. Designed to move smoke, fumes, and heat away from the operator. It has a simple ratchet mechanism to allow adjustment of air-flow angles. Rubber sleeves (feet) protect surfaces from getting scratched and keep the unit in place.

- 2 speeds • 7-1/2" x 6" x 4-1/2" • 130 cu. ft/min • 115 V, 60 Hz, 29 W • 8-ft cord
- Black



P/N	Description	Each
3037-BLK	Breezy-2, black	\$32.50

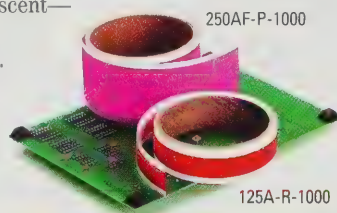


## TAPES II Inspection Arrows

Inspection arrows are used to quickly identify defects and areas to be reworked. When ordering please specify the size, color, and quantity per roll—P/N example: 125A-R-1000. All colors available in flourescent—P/N example: 375AF-Y-5000.

Colors:

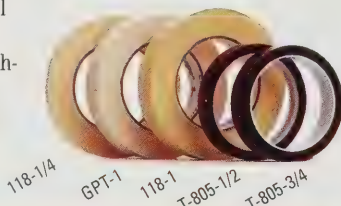
R = red,  
Y = yellow,  
G = green,  
P = pink



P/N	Size	1000/Roll	5000/Roll
125A	3/16" x 1/8"	\$3.50	\$17.50
250A	1/4" x 3/16"	4.45	22.25
375A	3/8" x 1/4"	5.10	25.50
750A	3/4" x 5/16"	8.65	43.25

## TAPES II Production-Wiring Tapes

We carry a full line of tapes including: high-temperature, general-purpose, and KAPTON.



P/N	Type	Yards	Each
118-1/4	1/4" hi-temp solder wave	60	\$3.00
118-1	1" hi-temp solder wave	60	7.50
GPT-1	1" general-purpose masking	60	1.35
T-805-1/2	1/2" KAPTON	36	11.15
T-805-3/4	3/4" KAPTON	36	15.85

## MARSHALL ESD Tapes

These cellophane tapes with a rubber-based adhesive help eliminate ESD from the workplace. They are available with or without a printed ESD awareness symbol.



- No ESD symbol

P/N	Description	1-24	25-49	50+
M-36101	1/2" wide, 1" core, 108' tape	\$1.40	\$1.20	\$1.00
M-36102	1/2" wide, 3" core, 216' tape	1.65	1.40	1.20
M-36103	3/4" wide, 1" core, 108' tape	1.95	1.65	1.40
M-36104	3/4" wide, 3" core, 216' tape	2.45	2.05	1.75
M-36105	1" wide, 1" core, 108' tape	2.60	2.20	1.85
M-36106	1" wide, 3" core, 216' tape	3.20	2.70	2.30
M-36107	2" wide, 3" core, 216' tape	6.00	5.00	4.30

- Clear cellophane tape with printed ESD symbols
- 3" core • 216' (L)

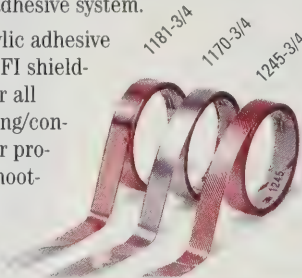
P/N	Description	1-24	25-49	50+
M-36142	Printed tape 1/2" (W)	\$4.35	\$3.65	\$3.10
M-36144	Printed tape 3/4" (W)	5.95	4.95	4.25
M-36146	Printed tape 1" (W)	7.45	6.20	5.30
M-36147	Printed tape 2" (W)	13.55	11.30	9.70

For additional ESD tapes, see page 105.

## 3M 1170 Aluminum Foil Shielding Tape

1170 is a dead-soft aluminum-foil-backed tape with a unique electrically-conductive, pressure-sensitive acrylic adhesive system.

- Conductive acrylic adhesive
- Effective EMI/RFI shielding
- Excellent for all electrical grounding/connecting
- Ideal for prototyping/troubleshooting
- UL Recognized



P/N	Description	Each
1170-1/2	Roll, 1/2" x 18 yd	\$16.15
1170-3/4	Roll, 3/4" x 18 yd	28.50
1170-1	Roll, 1" x 18 yd	32.25
1170-2	Roll, 2" x 18 yd	64.50

## 3M 1181 Copper Foil Shielding Tape

1181 is a dead-soft copper foil tape. Conductive particles in the adhesive provide an electrically-conductive path between the substrate and the backing.

- Conductive acrylic adhesive
- Effective EMI/RFI shielding
- Excellent for all electrical grounding/connecting
- Ideal for prototyping/troubleshooting
- Solderable
- UL Recognized

P/N	Description	Each
1181-1/4	Roll, 1/4" x 18 yd	\$7.15
1181-3/8	Roll, 3/8" x 18 yd	10.70
1181-1/2	Roll, 1/2" x 18 yd	14.25
1181-3/4	Roll, 3/4" x 18 yd	21.40
1181-1	Roll, 1" x 18 yd	28.50
1181-2	Roll, 2" x 18 yd	57.00

## 3M 1245 Embossed Copper Foil Shielding Tape

This tape combines highly effective shielding with the fast, clean, and easy application advantages of pressure-sensitive adhesive. The tape's embossed pattern provides reliable conductivity to metal substrates, actually protruding through the acrylic adhesive to make electrical contact.

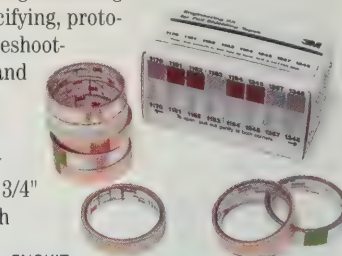
- Easy solderability
- Useful for static-charge draining
- Effectively shields EMI/RFI long term
- Restricts radiating energy
- UL Recognized

P/N	Description	Each
1245-1/2	Roll, 1/2" x 18 yd	\$12.35
1245-3/4	Roll, 3/4" x 18 yd	18.55
1245-1	Roll, 1" x 18 yd	24.70
1245-2	Roll, 2" x 18 yd	49.40

## 3M Engineering Kit for Foil Shielding Tapes

This kit provides users ready access to 3M's full line of shielding tapes. These tapes are designed for applications requiring point-to-point electrical contact, particularly EMI shielding, grounding, and static-charge draining. Ideal for specifying, prototyping, troubleshooting, testing, and repairing.

- 8 different rolls
- Handy
- Compact • 3/4" x 4 yards each

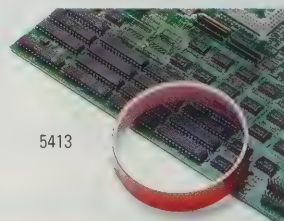


P/N	Description	Each
ENK1T	Engineering kit	\$49.95

## 3M 5413 Polyimide Tape

Because the 5413 has a strong, heat-resistant silicone adhesive, it resists adhesive transfer at elevated temperatures. Use it to mask off contacts on printed-circuit boards or to provide protection for bar codes that are repeatedly subjected to high temperatures.

- Color: amber
- Roll length: 36 yd
- Temperature use range: -100 °F to +500 °F
- Virtually no adhesive residue



P/N	Description	Each
5413-1/2	1/2" (W) polyimide film tape	\$18.35
5413-3/4	3/4" (W) polyimide film tape	27.55
5413-1	1" (W) polyimide film tape	36.70
5413-2	2" (W) polyimide film tape	73.40

## 3M 5419 Low-Static Polyimide-Film Tape

This is a translucent, polyimide-film-backed silicone-adhesive tape that has unique and extremely low electrostatic-discharge properties. It is for gold-tab protection during wave soldering of printed-circuit boards.



P/N	Description	Each
5419-1/2	1/2" x 36 yd, roll	\$18.70
5419-3/4	3/4" x 36 yd, roll	28.10
5419-1	1" x 36 yd, roll	37.45



*New Product: This symbol represents the industry's latest offerings.*



*We accept fax orders 24 hours a day, 7 days a week.*



*We provide reduced pricing on large-quantity orders.*



*We provide world-class quality ISO-9002-certified services and facilities.*



## 3M SUPER 88 SCOTCH BRAND Vinyl Electrical Tape

SUPER 88 is a premium-grade 8.5-mil tape with superior cold weather handling features.

- Premium grade
- Heavy-duty
- Flame-retardant
- Cold- and weather-resistant • 8.5 mil



P/N	Description	Each
88-SUPER-3/4"x66'	Vinyl plastic electrical tape	\$4.45

## 3M SUPER 33+ SCOTCH BRAND Vinyl Plastic Electrical Tape

SUPER 33+ is a premium-grade 7-mil tape that resists temperature and moisture in splicing applications.

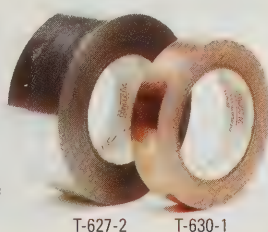
- Flame-retardant • Weather resistant

P/N	Description	Each
33-1-1/2"x44'	Electrical tape	\$5.50
33+SUPER-3/4"x66'	Roll in can	3.90

## TAPES II Copper-Foil Shielding Tape

T-630 is a copper-foil tape manufactured with an acrylic solvent-resistant/conductive adhesive. It is used to meet a variety of EMI/RFI-shielding applications in the electronics industry. T-630 is also an add-on for plating bars and gold fingers in the circuit-board industry. It comes with a liner for easy die cutting.

- Total tape thickness: 3.5 mil • Tensile strength: 35 lb per in



P/N	Description	Each
T-630-1/4	Roll, 1/4" x 18 yd	\$5.00
T-630-3/8	Roll, 3/8" x 18 yd	9.15
T-630-1/2	Roll, 1/2" x 18 yd	8.55
T-630-3/4	Roll, 3/4" x 18 yd	12.05
T-630-1	Roll, 1" x 18 yd	14.20
T-630-2	Roll, 2" x 18 yd	28.35

## TAPES II Aluminum-Foil Tape with Conductive Adhesive

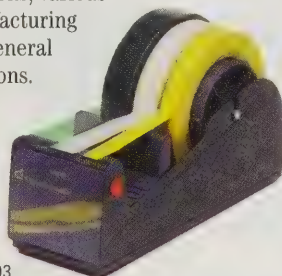
T-627 is a 2.0-mil aluminum-foil tape with conductive acrylic adhesive. The adhesive is uniformly dispersed with conductive spheres to provide the highest EMI/RFI-shield effectiveness available in a conductive aluminum-foil tape. T-627 meets the flame-spread requirements of UL 510. The electrical resistance meets MIL-STD-202C.

- Tensile strength: 16 lb per in

P/N	Description	Each
T-627-1/2	Roll, 1/2" x 18 yd	\$11.10
T-627-1	Roll, 1" x 18 yd	22.45
T-627-2	Roll, 2" x 18 yd	44.85

## TAPES II Multiroll Table-Top Dispensers

These dispensers are handy for electronics-manufacturing work stations, various circuit-board-manufacturing departments, and general industrial workstations. They dispense tape from multi-roll rolls from the same dispenser at the same time.

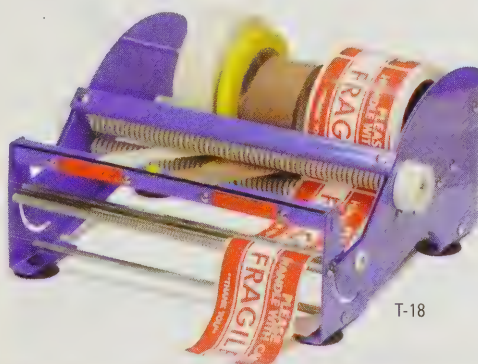


T-D3

P/N	Description	Each
T-D1	1-roll dispenser, holds up to 1"-wide tape	\$18.70
T-D2	2-roll dispenser, holds up to 2"-wide tape	22.75
T-D3	3-roll dispenser, holds up to 3"-wide tape	26.05

## TAPES II Multiroll Tape and Label Dispensers

These dispensers enable you to use both tape and label rolls in the same unit. They hold almost any size roll of tape or labels on any size core.



T-18

P/N	Description	Each
T-6	6" multiroll dispenser	\$53.80
T-12	12" multiroll dispenser	67.40
T-18	18" multiroll dispenser	94.20

## START Electronic Tape Dispenser

• Accurately feeds, measures, and cuts pre-set lengths of pressure-sensitive tape • Fully automatic cutting for clean, straight-cut tape ends • Advances next length of tape with a press of a button or can be set to feed automatically when a piece is removed • Tape width: 1/4" to 2" (3" core) • LED displays pre-set length from 3/4" to 39" in 1/25" steps • Power: 100-V AC • Size: 5-1/3" x 5-3/4" • Drive: DC motor for tape feed and cut

ZCM1000



P/N	Description	Each
ZCM1000	Electronic tape dispenser, white	\$590.00

## LOST RIVER ELV-AWAY™ Water-Soluble Tape and Dots

A water-soluble, biodegradable temporary solder mask that protects desired circuit-board areas from molten solder. It protects copper, gold, silver, and solder surfaces during assembly and soldering operations, then washes off in hot water. Solderability of the protected surface is not impaired and no residue is left after an aqueous wash-process is completed.

- Water-soluble (quickly and completely) for use with in-line or batch cleaning systems (140 °F)
- Noncontaminating—contains no corrosive compounds • Leaves no residue on printed-circuit boards after water cleaning • Biodegradable, non-toxic, and nonpolluting
- No drying or set-up time • Resists normal soldering temperatures
- Static free



WSD-1/2-Blue

WSD-1/4-Blue

P/N	Dots	Each
WSD-1/2-Blue	1/2", 5,000 dots	\$63.35
WSD-3/8-Blue	3/8", 5,000 dots	63.35
WSD-5/16-Blue	5/16", 5,000 dots	63.35
WSD-1/4-Blue	1/4", 5,000 dots	63.35

NOTE: Special shapes and sizes available upon request.

P/N	Tape	Each
WST-1-*	1" x 60 yd	\$30.00
WST-3/4-*	3/4" x 60 yd	28.35
WST-1/2-*	1/2" x 60 yd	22.65
WST 1/4-*	1/4" x 60 yd	12.50

\*Available in clear or blue.

## LOST RIVER Double-Coated-Tape Dispenser

This dispenser is designed to accommodate most pressure-sensitive double-coated tapes. It has simple "pull and cut" dispensing and conveniently winds up the discarded liner on a liner drum. Internal weights assure stay-in-place dispensing, there is no need to fasten down the dispenser for operating, yet it is portable.

- For use with most pressure-sensitive double-coated tapes • Tape widths: 1/4" to 2" • Tape roll diameter: Up to 6-1/4" on a 3" diameter core



M-712

P/N	Description	Each
M-712	Tape dispenser	\$180.35
M-712-1	Replacement blade	7.35



## LUFKIN Series-2000 Power Measuring Tapes

- Comfortable rounded case • Top-positioned toggle lock • Chrome-plated, high-impact case • Triple-riveted, virtually unbreakable end hook



P/N	Description	1-11	12+
2212	1/2" x 12' measuring tape	\$15.60	\$11.70
2325	3/4" x 25' measuring tape	27.20	22.25

## PEC TOOLS® Black Chrome Rules

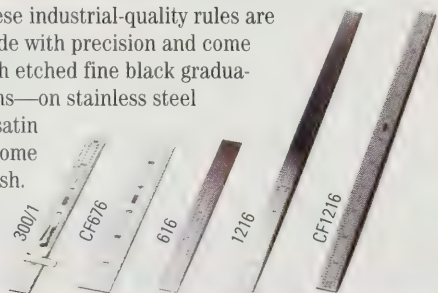
- Made from the finest stainless steel available • All rules fully hardened and tempered • Precisely etched, then white-filled for readability • Any graduations available by special order • Black chrome finish



P/N	Description	Each
501-006EZ	6" x 1/2" x .020", 5R (32nds, 64ths, 10ths, 100ths)	\$5.30
501-012EZ	12" x 1/2" x .020", 5R (32nds, 64ths, 10ths, 100ths)	9.45
501-018EZ	18" x 3/4" x .020", 5R (32nds, 64ths, 10ths, 100ths)	13.55
501-024EZ	24" x 3/4" x .020", 5R (32nds, 64ths, 10ths, 100ths)	21.05
751-150EZ	150 mm x 1/2" x .020"	4.95
751-300EZ	300 mm x 1/2" x .020", (1 mm, 0.5 mm)	8.75

## GENERAL Steel Rules

These industrial-quality rules are made with precision and come with etched fine black graduations—on stainless steel or satin chrome finish.

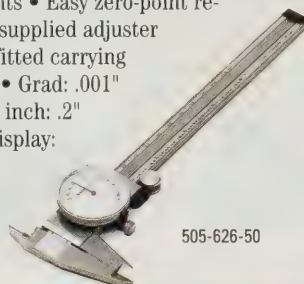


P/N	Description	Side 1	Side 2	Each
616	6" x 15/32", flex, 5R	10ths, 100ths	32ths, 64ths	\$4.55
1216	12" x 15/32", flex, 5R	10ths, 100ths	32ths, 64ths	7.45
CF676	6" x 3/4", rigid, 4R	8ths, 16ths	32ths, 64ths	6.70
CF1216	12" x 15/32", flex, 5R	10ths, 100ths	32ths, 64ths	10.15
300/1	6" x 15/32", flex, pocket clip	32ths, 64ths	Dec. equiv.	2.20

NOTE: CF prefix indicates satin-chrome finish.

## MITUTOYO Series 505 Dial Caliper

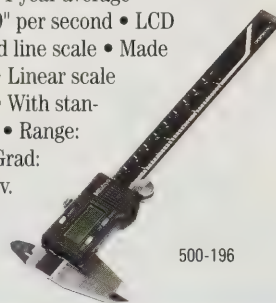
- Extra-rigid 3.4-mm-thick main beam • Extra-large dial face for easy reading • Hardened stainless steel throughout • Inside, outside, depth, and step measurements • Easy zero-point re-adjustment with supplied adjuster • Supplied with fitted carrying case • Range: 6" • Grad: .001" • Range per/Rev. inch: .2" (505-626-50) • Display: .0005" (.010 mm) • Depth of Jaw: 1-9/16"



P/N	Description	Each
505-626-50	Dial caliper	\$86.00

## MITUTOYO Series 500 DIGIMATIC Caliper

- Accuracy:  $\pm .001"$  • Repeatability: .0005" • Display: LCD, 5-digit • Control switches: on/zero, off, and in/mm • Battery life: 1 year average • Response speed: 40" per second • LCD display and imprinted line scale • Made from stainless steel • Linear scale embedded in epoxy • With standard measuring jaws • Range: 0-6" (0-150 mm) • Grad: .001" • Range per/Rev. inch: .1" • Display: .0005" (.010 mm) • Depth of Jaw: 1-9/16"



P/N	Description	Each
500-196	Digimatic caliper	\$143.00

## GENERAL Digital Caliper

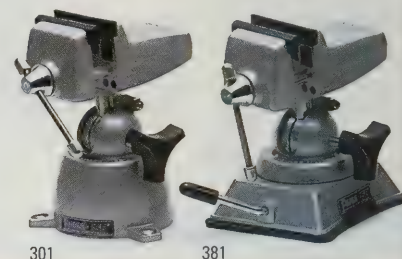
- 6" digital caliper • Accurate digital measurements in both inches and millimeters • Swiss-precision crafted • Direct reading: 0.001"/0.1 mm • Adjustable zero • Fiberglass-reinforced, super polyamid • Friction thumb roller • 4-way measurement: outside, inside, depth, step



P/N	Description	Each
143	Direct-reading digital caliper	\$77.25

## PANA VISE All-Purpose Vises

- 180° tilt action • 360° vise-head rotation • 360° locking-nut rotation • A single control knob locks work in any position



P/N	Description	Each
301	Standard bench-mount vise with 300 base and 303 head	\$40.00
381	Vacuum-base vise with 300 vacuum base and 303 head	52.00

## PANA VISE Circuit-Board Holders

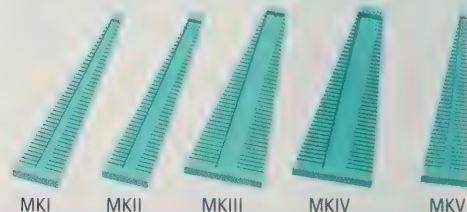
- Combines standard base with circuit-board holder • Hold boards up to 12" wide • Includes 300 base and 315 circuit-board holder • Arms may be moved independently in either direction • Longer bars and additional sets of arms are available



P/N	Description	Each
324	Portable circuit-board holder	\$71.00

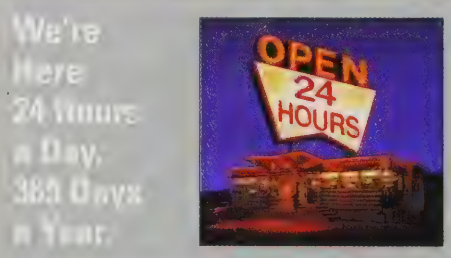
## THE GRANITE CORPORATION MARK Series Component-Lead Formers

The MARK Series component-lead formers are designed primarily for resistors and diodes from 1/8 watt to 2 watts. They produce a perfect bend without nicking the component lead.



P/N	Component Size	Equivalent Resistor-Style Size	1-9	10-19	20+
MKI	1/4 watt	RC07	\$3.95	\$3.60	\$3.30
MKII	1/2 watt	RC20	3.95	3.60	3.30
MKIII	1 watt	RC32	4.95	4.55	4.15
MKIV	2 watts	RC42	4.95	4.55	4.15
MKV	1/8 watt	RC05	3.95	3.60	3.30

NOTE: Conductive version available, add "-C" to part number. Call for pricing.





## EPC MICROLABELLER® 212

MICROLABELLER 212 is a small, portable printer that is budget-priced. It has 3 speed settings and a maximum speed of 4"/s at 203 dpi.

The included PERFECT LABEL software is WINDOWS-based and prints standard bar codes, alphanumerics, and graphics. It allows you to have several label formats open at the same time and to rotate data. A zoom feature makes editing easy.



3410-0250-00

P/N	Description	Each
3410-0250-00	Portable printer and software	\$1095.00

## EPC LABELS

These labels are for the identification needs of electronics assembly.

- Solvent-, abrasion-, and temperature-resistant
- Polyimide for PC boards • UL-Listed and CSA approved polyesters
- Self-laminating cable labels
- Many standard label sizes for dot-matrix and thermal-transfer printing
- Meet all MIL-SPECS



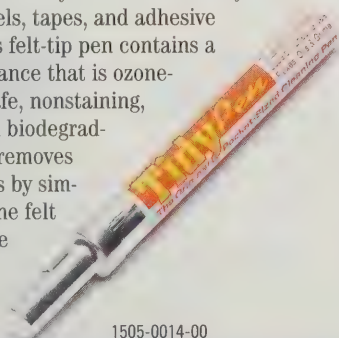
P/N	Material	Label Size H x W	Web Width	Horiz. Rep.
1-EW10R	White polyester	.2" x .650"	8.85"	.8"
7-EW10R	White polyester	.5" x 1"	8.6"	1.1"

P/N	Vertical Rep.	Labels Per Row/Qty.	Each
1-EW10R	.250"	10/10,000	\$78.90
7-EW10R	.666"	7/10,000	\$151.95

NOTE: Other label formats and materials are available.

## EPC TIDY PEN® Label and Adhesive Remover

TIDY PEN is a handy tool for effectively removing labels, tapes, and adhesive residues. This felt-tip pen contains a natural substance that is ozone-safe, static-safe, nonstaining, nontoxic, and biodegradable. It even removes film materials by simply working the felt tip around the edges of labels.

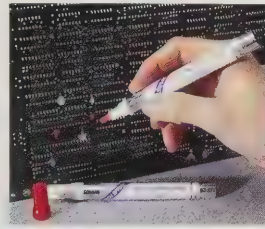


1505-0014-00

P/N	Description	Each
1505-0014-00	TIDY PEN, 14 mL	\$7.95

## TECH SPRAY Solder-Fault Markers

These convenient markers are designed to mark solder faults for identification and subsequent rework. A highly visible orange or white color combined with a black-light indicator ensures quick recognition. The marking agent is quick drying, nonstringing, and can be removed with warm water or solvent.

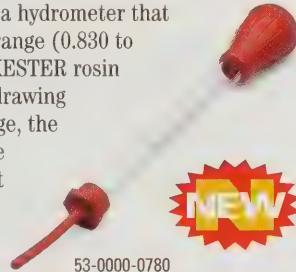


1850-W 1850-O

P/N	Description	Each
1850-O	Orange fault marker, 10 mil	\$5.25
1850-W	White fault marker, 10 mil	5.25

## KESTER Hydrometer

Checking the specific gravity or density of rosin fluxes used for wave soldering is a requirement for controlling the process. This kit includes a syringe, bulb, and a hydrometer that is calibrated to a range (0.830 to 0.930) suited for KESTER rosin fluxes. By simply drawing flux into the syringe, the hydrometer can be read and the exact amount of thinner added to correct the density.



53-0000-0780

P/N	Description	Each
53-0000-0780	Hydrometer	\$27.00

## MASTER® LOCK 4-Pin-Tumbler Series Locks

• Tough, laminated, cadmium-rustproofed-steel case with nickel-plated shackle • Removable key-change number for added security • Two brass keys included with each lock • Exclusive dual steel locking levers independently lock each shackle leg



P/N	Body Width	Shackle Diameter	Horizontal Shackle Clearance	Vertical Shackle Clearance	Each
7	1-1/8"	3/16"	1/2"	9/16"	\$7.00

NOTE: The following modifications are available: KA = keyed alike, MK = master keyed, and C-chain attached to shackle.

## MASTER LOCK Combination Padlocks

- Stainless-steel case with hardened steel shackle
- 3-digit dialing
- Black dial

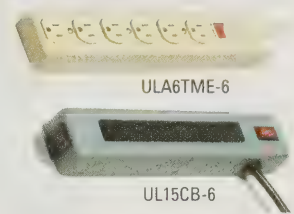
1500



P/N	Width	A	B	C	Each
1500	1-7/8"	9/32"	3/4"	13/16"	\$5.50

## SL WABER ULA PREMIER GROUP Multiple-Outlet Strips

- Circuit-breaker
- Maximum rating: 15 A, 125 V
- UL Listed



The following products each come with 6 outlets and a master switch with pilot light.

P/N	Description	Cord Length	Each
ULA6TME-6	Multiple outlet strip	6'	\$24.95
ULA6TME-15	Multiple outlet strip	15'	28.95

## ULA Mid-Length Group

- Size: 13-1/4" x 2-3/8" x 1-1/2" • Maximum rating: 15 A, 125 V

The following products each come with 1 switch, 1 pilot light, 6' cord, and a circuit-breaker.

P/N	Description	No. of Outlets	Each
UL15CB-6	Multiple outlet strip	7	\$32.00
UL24CB-6	Multiple outlet strip	6	28.55

NOTE: The 15-series has one outlet on the end.

## SL WABER TRIMLINE® Series

These rugged, versatile multi-length strips provide real convenience wherever multiple outlets are required. They are widely used on workbenches, production lines, and lab tables. They all come with a circuit-breaker, master switch, and a pilot light.

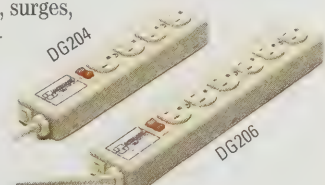


P/N	Description	Each
UL7408-6	4-ft case, 8 outlets, 6-ft cord	\$50.90
UL7408-15	4-ft case, 8 outlets, 15-ft cord	55.15
UL7415-6	4-ft case, 15 outlets, 6-ft cord	59.75
UL7415-15	4-ft case, 15 outlets, 15-ft cord	64.00

## SL WABER DATAGARD SILVER Series

The SILVER Series provides economical surge protection for general office equipment including: computers, word processors, and calculators.

- UL-TVSS1449-approved • Guards equipment and data from spikes, surges, dips, and brown-outs
- Protects equipment from RFI/EMI
- Lifetime warranty



The following products each have a circuit-breaker and no surge indicator.

P/N	Description	No. of Outlets	Each
DG204	Multiple outlet strip	4	\$24.95
DG206	Multiple outlet strip	6	29.95



## LEICA High-Performance Stereomicroscopes

### LEICA GZ6 Stereomicroscope

The LEICA GZ6 is engineered to meet your inspection requirements for performance, versatility, and comfort. The 6:1 magnification range (6.7x–40x, standard) allows you to inspect samples under a wide range of magnifications (2x–160x). A selection of eyepieces and supplementary lenses allow you to customize the field of view to your specific applications. Working distances of 40 mm–350 mm can be achieved with the appropriate supplemental lens.

- ERGOZOOM allows you to move through a 6:1 magnification range with a single hand motion
- ZEROSTAT protects against airborne-static shock
- MAGNISET sets limits within the zoom range, guaranteeing repeatability of magnifications
- Wider field of view and a standard 115-mm working distance assure better, faster, and more-reliable performance

### LEICA GZ6E Ergonomic Stereomicroscope

The LEICA GZ6E is the world's only stereomicroscope to offer 2 viewing angles (45°, 60°). The LEICA GZ6E features rotatable eyepieces which, in a single easy motion, can be positioned to 1 of 2 viewing angles. The GZ6E features a port that allows upgrading of the system with either a coaxial illuminator or a video-image port for video observation.

### GZ6/GZ6E Accessories

The LEICA image-port system is designed to bring video and photographic capabilities to the GZ6/GZ6E stereomicroscopes. The GZ6/GZ6E coaxial illuminator is designed to illuminate flat specimens with moderate-to-high reflectivity.



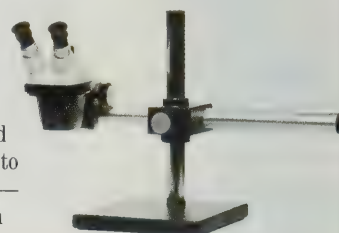
P/N	Description	Each
13410106-01	GZ6 basic unit: GZ6 pod (13410106), two 10x eyepieces (13410750), basic stand (13445635)—illuminator not included	\$1465.00
13410106-02	GZ6 swing-arm unit: GZ6 pod (13410106), two 10x eyepieces (13410750), mountable focusing arm (13445633), S-stand (312714)—illuminator not included	1856.00
13410106E-01	GZ6E basic unit: GZ6E pod (13410106E), two 10x eyepieces (13410750), basic stand (13445635)—illuminator not included	1741.00
13410106E-02	GZ6E swing-arm unit: GZ6E pod (13410106E), two 10x eyepieces (13410750), mountable focusing arm (13445633), S-stand (312714)—illuminator not included	2132.00
13421287-09	High-performance color-video system for GZ6/GZ6E: LEICA color CCD video camera (421286), coaxial cable (421283), power supply (421273), 13" color monitor (421281), image port (13410301), 1/2" CCD video coupler (13410306)	4296.00
8014836	Coaxial illumination system for GZ6/GZ6E: coaxial illuminator (13410300), LEICA CLS 150E (30110522), 2 flexible arms for GZ6 "coaxial" body (30150229)	1381.00

NOTE: A variety of supplementary lenses and eyepieces are available.

### LEICA STEREOZOOM 4 Stereomicroscope

The optical excellence of this unit allows for better, faster, more-reliable identification, analyses, and measurement. It is equipped with GREENOUGH optics (2 completely separate light paths, 1 for each eye). This design provides high observational capacity and extremely high resolution without distortion or aberration—for a sharper image over the entire field of view. The unit is compatible with a full range of eyepieces, stands, illuminators, and supplementary lenses.

- 4:1 zoom in a basic stereomicroscope
- Precentered optical mounting system assures consistent alignment
- Magnification ranges from 2.1x to 180x with supplementary lenses
- 100-mm standard working distance, adjustable from 34 mm to 247 mm
- Large selection of accessories—permits its use for any application within any budget
- 5-year factory warranty



13-31-26-40-73

P/N	Description	Each
13-31-26-40-73	SVB-73 STEREOZOOM 4: pod, S-stand, E-arm, and 10x eyepieces—illuminator not included	\$2002.00

NOTE: A variety of supplementary lenses and eyepieces are available.

### LEICA GZ4 Stereomicroscope

At an economical price, the LEICA GZ4 stereomicroscope offers a fundamental solution to a variety of 3-dimensional viewing needs. The modern design of the LEICA GZ4 combined with its strong, rugged construction allows for a comfortable yet productive interface.

- 4:1 zoom in a basic stereomicroscope
- Precentered optical mounting system assures consistent alignment
- Magnification ranges from 2.1x to 180x with supplementary lenses
- 92-mm standard working distance adjustable from 35 mm to 243 mm
- 20-mm wide field of view and 10x eyepieces speed inspection—ideal for inspecting large specimens
- ZEROSTAT (light-weight protective material), is specifically designed to dissipate static charges—protecting the sample and user from electrostatic discharge (ESD)
- Large selection of accessories permits use for any application within any budget
- 5-year factory warranty



13410104-01

P/N	Description	Each
13410104-01	Basic configuration includes: GZ4 pod (13410104), two 10x eyepieces (311581-02), and GZ4 basic stand (13445645)—illuminator not included	\$1201.00
13410104-03	Swing-arm configuration includes: GZ4 pod (13410104), two 10x eyepieces (311581-02), GZ4 mountable focus arm (13445643), and stand (312714)—illuminator not included	1578.00

NOTE: A variety of supplementary lens and eyepieces are available.

### LEICA™ ZOOM 2000

The ZOOM 2000's optics are manufactured from high-quality glass and its optical system is completely encased in the microscope's body to resist damage from dust and dirt. Its 4:1 variable magnification zoom system includes the capability to change its viewing perspective with the turn of a knob.

- Attractive price
- 3-way illumination
- Wide-field eyepieces
- Built to last



13312598

P/N	Description	Each
13312598	Microscope 7x-30x	\$993.00
13312594	Microscope 10.5x-45x	993.00



## From the bench

### Inspection Stereomicroscopes

Courtesy of Leica

As printed-circuit boards get packed tighter, with smaller components that have even smaller lead pitches, their visual inspection becomes increasingly more difficult. The instrument of choice, for meeting this challenge, is the 3-dimensional-imaging stereomicroscope. Since the specific requirements vary, due to the type of application and the type of environment in which the inspection is performed, the following guidelines should be considered when specifying an inspection stereomicroscope.

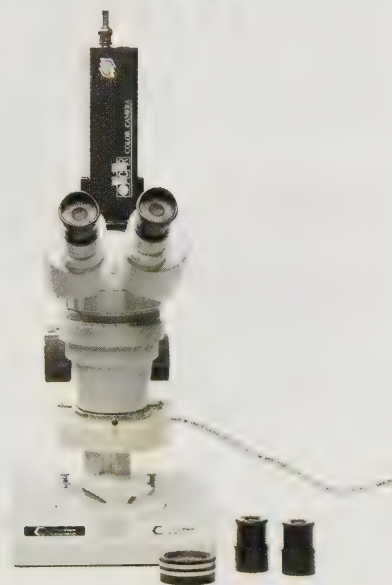
- (1.) Select a stand that can accommodate your sample—a basic stand for small samples and a swing-arm stand for large PC boards.
- (2.) Choose the magnification range based on the size of the samples you wish to inspect.
- (3.) Choose a light source that provides the best illumination for your type of samples. Fiber-optic ring-lights and flexible goose-neck lights are good for most applications but for highly reflective samples such as wafers or polished metals, coaxial light sources are a must.
- (4.) For digital-video observation and image archiving, a stereomicroscope with a photo/video-image access port is needed.
- (5.) If ESD is a concern, you should choose a microscope that is manufactured with materials that dissipate or conduct charges away from your samples.

### CLEARVIEW INSTRUMENTS™ Complete System with Monitor, CCD Camera, and Illuminator

- State-of-the-art video viewing • Complete system • Limited lifetime warranty • Easy to use • Economically priced
- Includes 10x eyepieces, .5x auxiliary lenses, and pedestal base • MOD230 available with boom stand



MOD280



P/N	Description	Each
<b>MOD230</b>	Trinocular stereoscopic zoom microscope with boom stand, fluorescent ring illuminator, CCD camera, and monitor	<b>\$3979.00</b>
<b>MOD234</b>	Trinocular stereoscopic zoom microscope with boom stand, fiber-optic ring illuminator, CCD camera, and monitor	<b>4535.00</b>
<b>MOD280</b>	Trinocular stereoscopic zoom microscope with pedestal stand, fluorescent ring illuminator, CCD camera, and monitor	<b>3569.00</b>
<b>MOD284</b>	Trinocular stereoscopic zoom microscope with pedestal stand, fiber-optic ring illuminator, CCD camera, and monitor	<b>4125.00</b>

## VTEK SPECTRA and RAINBOW Video Magnifier Systems

Versatility and ease-of-use make these video magnifiers unique in the industry. No longer do you need to piece together a system from a variety of components. The optical and mechanical subsystems of VTEK's products are specifically designed and manufactured to create a self-contained and powerfully optimized system.

Being a member of the TELESATORY corporate family, the world's largest producer of video magnifiers, VTEK is able to take advantage of design and manufacturing efficiencies that enable it to offer products at surprisingly affordable prices.

### SPECTRA System

The SPECTRA is the "top-of-the-line" system. It has a CCD color camera, zoom lens, illumination system, and unique video electronics—all packaged in a streamlined and ergonomic housing. Plus, its controls are intuitive and easy-to-use, minimizing operator training.

- Variable magnification • Uses any monitor
- High depth-of-field • Large field-of-view • Full-



VRB-1

- color and dual-color • Dual-image capability
- Multiple video outputs: VGA/SVGA, S-video (a.k.a. Y-C and S-VHS), and NTSC composite (TV)
- Downloadable image • Constant-focus lens • X-Y moveable table • Monitor sold separately

### RAINBOW System

The RAINBOW is an all-in-one compact system containing a CCD color camera, 14" color monitor, zoom lens, illumination system, and unique video electronics—packaged in a streamlined and ergonomic housing. The controls are intuitive and easy-to-use, minimizing operator training.

- Variable magnification • Streamlined, ergonomic design • Built-in 14" monitor • High depth-of-field • Large field-of-view • S-video output
- Downloadable image • Internal fluorescent lighting • Y-direction moveable table is standard—X-Y moveable table is optional

P/N	Description	Each
<b>VSP-1</b>	SPECTRA system	<b>\$3995.00</b>
<b>VRB-1</b>	RAINBOW system	<b>3995.00</b>



# SONORA MANUFACTURING GROUP

## InspectaCam™ Video Inspection Systems



Enhance your training and communications with the InspectaCam video inspection system. Minimize cost-

ly rework by using the InspectaCam to locate even tiny defects in workmanship.

Utilizing a stage mount, rework can be done while using the InspectaCam. With convenient fingertip focus, the hand-held IC-500 allows users to view tiny items in comfort, without the stress of squinting or bending over a microscope. It can also be mounted on a stand for hands-free operation. The IC-500 is able to get into places ordinary viewing systems can't. Also available are the IC-750 Series and IC-800 Series systems which feature higher magnification ranges and stage-mount designs. View your subject on the monitor, included with your system, or take advantage of the other InspectaCam options: snap a video print, capture on S-VHS tape, or save directly to a PC with the IC-8000 PC/video interface.

### IC-500 Hand-Held Video Inspection System includes:

- 10x–30x or 20x–40x magnification • InspectaCam high-resolution pencil-style camera • Integrated light source • IC-0015 camera stand with quick-detach mount • 13" monitor

### IC-750 Video Inspection System with Stage includes:

- 15x–65x or 25x–85x magnification • InspectaCam high-resolution camera • 3"–7" working distance • F1:F1.8 system lens • C-clamp mount lighted stage • Laser positioning indicator with foot-pedal operation • 13" monitor

### IC-800 Video Inspection System with Stage includes:

- 15x–95x or 25x–140x • InspectaCam high-resolution camera • 3"–12" working distance • F1:F1.8 system lens • C-clamp mount lighted stage • Laser positioning indicator with foot-pedal operation • 13" monitor

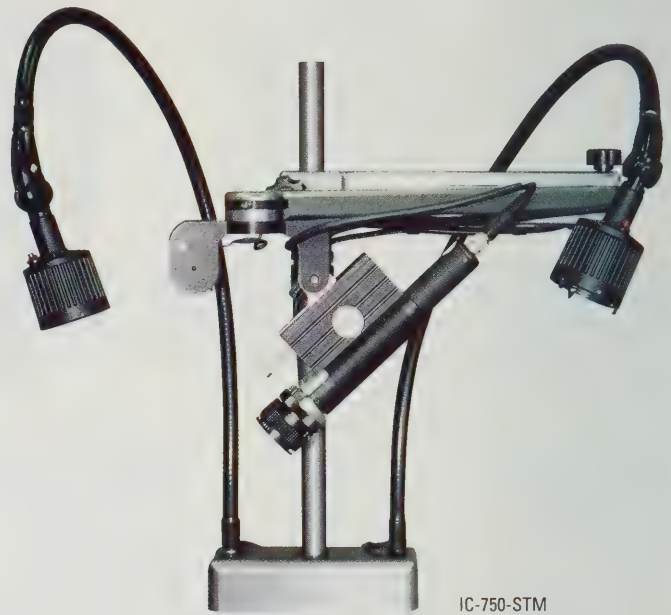
### Optional System Peripherals

**IC-8000 PC/Video Interface** (Capture card and software)—It allows you to send images directly to your PC. You can E-mail the photos with your existing E-mail system.

**IC-0006 Color-Video Printer System**—It includes a color-video printer with remote control, film pack (25 exp. [3.5" x 5" prints]), and system connecting cables.

**IC-0010 High-Resolution-Video Recording System for High-Quality Recordings**—Use it for employee training, failure analysis, and process control. It includes a S-VHS video-cassette recorder with remote control, S-VHS video tape, and system connecting cables.

**IC-3001-MG Proscenium X/Y Glide Stage**—It is designed to create more freedom of inspection by providing true-X and true-Y movements with solenoid controls. A whisper-quiet full-motion range of 165 square inches allows for a large variety of travel options. The stage comes complete with an antistatic mat, ground pin connector, and 1-hand solenoid controls for ergonomic convenience.



IC-750-STM



IC-500



IC-3001-MG

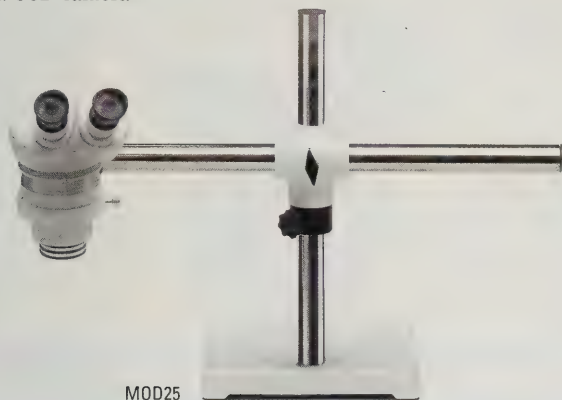


P/N	Description	Each
IC-500	10x–30x video inspection system	\$3495.00
IC-500A	20x–40x video inspection system	3495.00
IC-750-S	15x–65x video inspection system	5695.00
IC-750-STM	15x–65x video inspection system with 2 lamps	6950.00
IC-750A-S	25x–85x video inspection system	5695.00
IC-800-STM	15x–95x video inspection system, 2 lamps on articulating arms	7100.00
IC-800A-S	25x–140x video inspection system, 1 lamp on boom arm	5895.00
IC-8000	PC/video interface	585.00
IC-0006	Color-video printer system	1995.00
IC-0010	High-resolution-video recording system	1075.00
IC-9025	Range extender	149.00
IC-3001-MG	Proscenium X/Y glide stage	1995.00



## CLEARVIEW INSTRUMENTS Stereoscopic Zoom Microscopes

• Superior optical design • Parfocal zoom system • Comfortable 45° viewing angle for fatigue-free viewing • Range: 0.7x–4x; extends to 3.5x and 160x with optional optics • Lifetime warranty • MOD23 and MOD28 include adapter to mount a CCD camera



MOD25

P/N	Description	Each
MOD25	Binocular stereoscopic zoom microscope, boom stand, 10x eyepieces, .5x aux. lenses	\$1505.00
MOD26	Binocular stereoscopic zoom microscope, 10x eyepieces, .5x auxiliary lenses	1095.00
MOD28	Trinocular stereoscopic zoom microscope, 10x eyepieces, .5x auxiliary lenses	1795.00
MOD23	Trinocular stereoscopic zoom microscope, boom stand, 10x eyepieces, .5x auxiliary lenses	2205.00

## CLEARVIEW INSTRUMENTS Economy Stereoscopic Microscope

• Economical • High resolution • Compact size • Easy to use • Lifetime warranty • Total magnification: 10x • 10x eyepieces • 40x with optional optics • Includes 3" threaded extension posts



MOD24

P/N	Description	Each
MOD24	Economy stereoscopic microscope	\$549.00

## STOCKER & YALE Fluorescent-Ring Light Illuminators

• 360° of uniform, shadowless, cool illumination with 1,450 FC of brightness at a distance of 3" • 6,000-kelvin color temperature, ideal for general microscopy use as well as inspection of printed-circuit boards and color-coated electronic components • Lightweight, rugged, shock-resistant housing designed specifically to eliminate bulb breakage while in use • Long lamp life (4,500+ hr) results in low replacement costs and less down time



091M118WL

P/N	Description	For Use with the Following Microscopes
091M118WL	Illuminator with male threaded adapter	LEICA STEREOZOOM 6 and SZ4
091M108WL	Illuminator with dual-threaded adapter	LEICA STEREOZOOM 1, 2, 3, 4, 5, GZ4
091M206WL	Illuminator with 3-set-screws adapter	LEICA GZ6/GZ6E with objective
091M231WL	Illuminator with threaded adapter	LEICA GZ6/GZ6E without objective
101K211WL	Illuminator with 3-set-screws adapter	CLEARVIEW

P/N	Description	Each
091M118WL	Illuminator with male threaded adapter	\$230.00
091M108WL	Illuminator with dual-threaded adapter	230.00
091M206WL	Illuminator with 3-set-screws adapter	230.00
091M231WL	Illuminator with threaded adapter	230.00
101K211WL	Illuminator with 3-set-screws adapter	275.00
973-365	Black-light blue bulb (UV)	65.00
973-510	Standard white bulb	45.00
973-585	Yellow bulb	65.00

## STOCKER & YALE Fiber-Optic Microscope Illuminator System

This system puts extra-bright, cool light exactly where you need it. It's ideal for applications that require high quality control, such as: laboratory, robotics, closed-circuit television, biological analysis, photography, industrial, machine vision, and more.

### Dual Gooseneck

• Compact, efficient cold-light source • Self-supporting, positionable light guides for oblique lighting and clear viewing • Adjustable slide-lock focusing lenses provide a variety of light-delivery options



201KD627024G

### Ring Lights

• 360° of uniform cold-light output • Shadow-free, glare-free lighting • Efficient 150-W halogen bulbs • Variable-intensity light control



201KR237036P

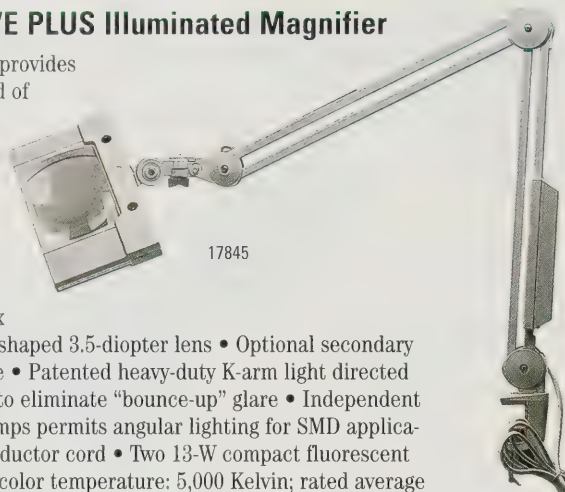
P/N	Description	Each
201KD627024G	Fiber-optic light source with dual gooseneck, positionable light guides	\$475.00
30123400	Focus lens with adjustable slide lock for gooseneck	27.00
201KR237036P-2	Fiber-optic light source with compact, shadow-free ring light for LEICA STEREOZOOM 1-5 and GZ4	645.00
201KR237036P-3	Fiber-optic light source with compact, shadow-free ring light for LEICA STEREOZOOM 6 and SZ4	645.00
201KR137036P	Fiber-optic light source with compact, shadow-free ring light for LEICA GZ6	620.00
201KR137036P-4	Fiber-optic light source with compact, shadow-free ring light for LEICA GZ6 (no objective)	645.00
20094145	Halogen replacement bulb, 1550 W/EKE	22.00



## LUXO WAVE PLUS Illuminated Magnifier

This magnifier provides the largest field of view available without taking up excessive amounts of the user's work area.

- Large 6-3/4" x 4-1/2" stadium-shaped 3.5-diopter lens
- Optional secondary lenses available
- Patented heavy-duty K-arm light directed from the sides to eliminate "bounce-up" glare
- Independent switching of lamps permits angular lighting for SMD applications
- 7' 3-conductor cord
- Two 13-W compact fluorescent tubes (36205); color temperature: 5,000 Kelvin; rated average life: 10,000 hours
- Lens: clear optical-grade glass; ground and polished
- Optional antireflective lens eliminates glare



### Ordering Guide

Most users begin with the standard 3.5-diopter factory-installed primary lens and then add secondary lenses as their needs dictate. Secondary lenses simply snap into the underside of the WAVE PLUS lamp head.

The following products each come in light grey with a 3.5-diopter lens.

P/N	Arm Reach	Mounting	1-4	5-9	10+
17845	45"	Clamp-on	\$435.00	\$331.25	\$273.00
17846	30"	Clamp-on	435.00	360.00	295.00
17847	30"	Weighted base	495.00	385.00	340.00
17841	45"	Clamp-on with antireflective lens	645.00	490.00	425.00
36205		Replacement fluorescent tube	25.00	19.10	18.00

## LUXO WAVE PLUS Illuminated-Magnifier Secondary Lenses

P/N	Lens Diopter	Mounting	1-4	5-9	10+
50074LG	4	Snap-in	\$54.00	\$49.00	\$41.00
50078LG	8	Snap-in	59.00	52.00	48.00

## LUXO LEDU TASKMASTER Magnifiers

This is a medium-duty magnifier with a stamped metal shade, housing a 5" diameter lens.

- 42" arm, clamp-on
- 22-W CIRCLINE fluorescent tube
- 3- or 5-diopter lens
- 3-conductor cord and plug
- UL Listed

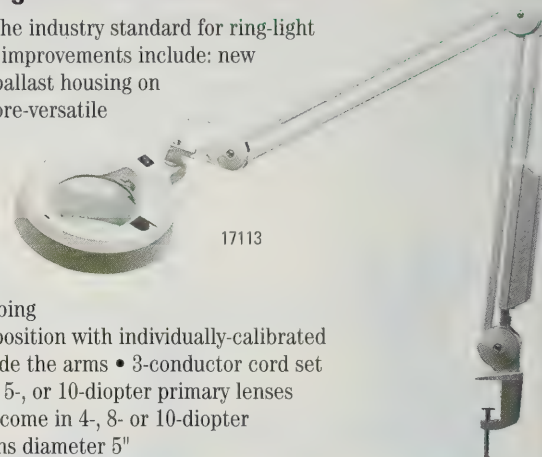


P/N	Description	Lens Diopter	1-4	5-9	10+
L712BK	1M12D Magnifier, black	3	\$165.00	\$139.00	\$116.00
L7125BK	1M12D Magnifier, black	5	180.00	156.00	127.00

## LUXO KFM Magnifier Series

The KFM series is the industry standard for ring-light magnifiers. Recent improvements include: new instant-on switch, ballast housing on back arm, and a more-versatile neck assembly for easier magnifier positioning.

- Die-cast aluminum shade
- Heavy-duty arms made from steel tubing
- Maintains exact position with individually-calibrated springs housed inside the arms
- 3-conductor cord set
- Available with 3-, 5-, or 10-diopter primary lenses
- Accessory lenses come in 4-, 8- or 10-diopter magnification
- Lens diameter 5"



P/N	Arm Reach	Lens Diopter	1-4	5-9	10+
17113	45" w/clamp	3	\$270.00	\$214.00	\$159.00
17253	30" w/weighted base	3	345.00	275.00	225.00
17115	45" w/clamp	5	285.00	220.00	185.00
17255	30" w/weighted base	5	360.00	290.00	240.00
17110	45" w/clamp	10	320.00	260.00	205.00

NOTE: Standard finish is light grey.

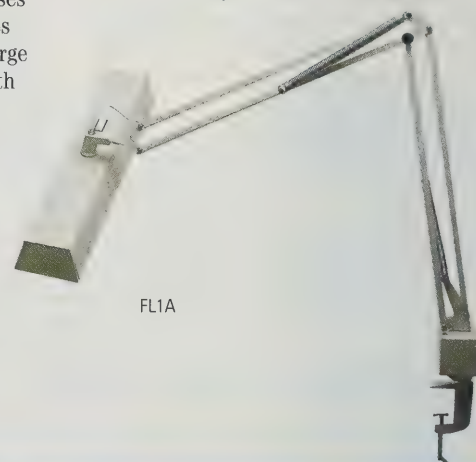
## LUXO KFM Magnifier-Series Accessory Lenses

P/N	Description	1-4	5-9	10+
50201	4-diopter lens	\$52.00	\$42.85	\$33.25
50202	8-diopter lens	58.00	44.10	37.75
50203	10-diopter swing-away lens	117.00	91.15	78.00
50206	10-diopter swing-away lens, Rev A*	117.00	91.15	78.00
30474	5-diopter lens	38.00	31.00	25.10
30475	10-diopter lens	75.00	57.00	46.00
30476	3-diopter lens	25.00	23.00	21.00
T-9	22 W replacement tube	10.00	9.50	9.10

\*For use with new KFM Series only—made after 5/17/93.

## LUXO FL Series Task Light

- Sturdy metal shade houses two 15-W fluorescent tubes
- Ideal for illuminating large work areas
- Available with 45" or 30" external-spring arms 3-conductor cord
- UL Listed



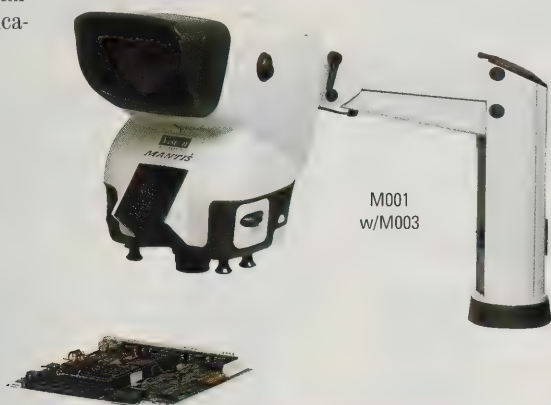
P/N	Description	1-4	5-9	10+
FL1A	45" reach, edge clamp, grey	\$220.00	\$170.00	\$142.10
FL2A	30" reach, edge clamp, grey	220.00	170.00	142.10
FL2FE	30" reach, weighted base	290.00	227.75	190.00
T-8	15 W replacement tube	7.50	7.35	7.10



## VISION ENGINEERING MANTIS® Viewing System

The MANTIS viewing system increases productivity and improves quality by dramatically reducing eyestrain and muscle fatigue. Its flexibility allows it to be used for all applications including: hand assembly, rework, PCB repair, and quality-control inspection.

- High-resolution stereo optics • True 2x, 4x, 6x, 8x, and 10x linear magnification • Large field of view • Ergonomic working positions and distance
- Adjustable illumination • Magnification lenses sold separately



P/N	Description	Each
M001	MANTIS head assembly without magnification lenses	\$1140.00
M003	MANTIS universal mounting stand with lamp power supply (12 V)	460.00
M222	2x magnification lens	115.00
M444	4x magnification lens	140.00
M004	6x magnification lens	205.00
M008	8x magnification lens	230.00
M009	10x magnification lens	415.00
55109	Lamp (12 V, 20 W), (2,000 hours)	15.00

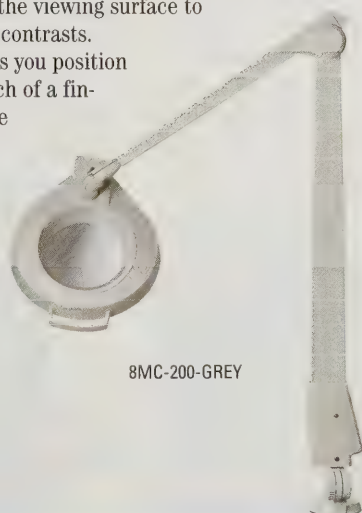
MANTIS is a registered trademark of Vision Engineering, Inc.

## DAZOR™ CIRCLINE Magnifier

DAZOR 8MC-Series lamps provide even, shadow-free light under the magnifying lens with a 22-W CIRCLINE fluorescent. This type of lighting is best when you want to de-emphasize irregular or uneven surfaces. The circular light source uniformly illuminates the viewing surface to eliminate shadows and enhance color contrasts.

The contemporary "floating arm" lets you position the light source and lens with the touch of a finger. The all-metal head that houses the magnifying lens is designed to provide years of service.

The 5"-crown optical glass lens produces a sharp image over a wide viewing area and is available in magnification powers of 3-diopters (.75x) and 5-diopters (1.25x). Another option includes a 11-diopter (2.75x) lens system with a 3" viewing area. For precise inspection, DAZOR's 4-power, 16-diopter lens system meets the government standard MIL-STD-2000.



P/N	Description	1-4	5-9	10+
8MC-200-GREY	All-purpose illuminated magnifier, 3-diopter	\$195.00	\$148.00	\$132.15
8MC-200-5-GREY	All-purpose illuminated magnifier, 5-diopter	223.00	167.70	151.50
1400	Optional add-a-lens for 11-diopter viewing	28.00	26.00	23.00

## ELECTRIX 75-W Halogen Magnifier Lamp

- Heavy-duty arms with locking control knobs at all joints • Two-position (high, low) light switch • 9-1/2' 3-conductor cord with convenient outlet at base of arms
- Fully-adjustable ratchet-lock clamp or weighted base

The following 2 products each comes with a 45"-long arm, 3-diopter lens and clamp-on mount.



P/N	Description	Each
7426-B	75-W magnifier lamp, black, clamp base	\$192.50
7426WB-B	75-W magnifier lamp, black, weighted base	228.50

## ELECTRIX Halogen Clamp-On Lamp

This low-voltage task lamp has a 32" flexible gooseneck that delivers light exactly where you need it. It comes with a VC-6 adjustable-angle clamp.

- 8-ft cord • On/off switch • Rugged construction • 50-W halogen bulb
- Cool-to-the-touch shade
- 32" flexible gooseneck



P/N	Description	Each
7307-B	Halogen clamp-on lamp	\$125.00

## DAZOR™ STRETCH-VIEW® Rectangular Magnifier

The rectangular-shaped magnifying lens "stretches" the 5" circular viewing area to 6.75". This wider viewing area allows for comfortable viewing with both eyes, plus it reduces eye strain and fatigue. Visual scanning speed is increased because more surface area is magnified. The 3-diopter lens is made of crown optical glass and measures 6.75" x 4.25".

With proper illumination levels, magnification requirements are significantly reduced. That's why DAZOR uses a powerful 18-W, compact fluorescent light source to produce 130 footcandles at 15" above the work surface.

You can choose between even, shadow-free illumination or a highlighting effect. Shadow-free viewing is achieved by holding the object directly under the light source. A highlighting effect is achieved by moving the object slightly away from the center of the light source.

The STRETCH-VIEW is available in an ESD-safe version that is ideal for inspecting electronic parts and circuit boards.



P/N	Description	1-4	5-9	10+
8MR-200-GREY	Rectangular magnifier, 3-diopter lens	\$330.00	\$271.00	\$220.50
8MR-200-5-GREY	Rectangular magnifier, 5-diopter lens	340.00	281.00	230.00
8MR-200-11-GREY	Rectangular magnifier, 11-diopter lens	350.00	291.00	245.00
8MR-200-ES-5	Rectangular magnifier, 5-diopter lens, ESD safe	365.00	297.00	241.00



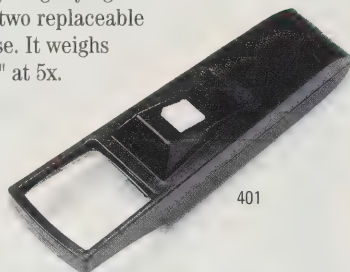
## EXCELTA MAGNA-LITE Illuminated Optical Magnifier

The 401 magnifier is perfect for quality-control and inspection personnel. The powerful optical-quality magnifying lens comes with a GE magnifying bulb and two replaceable batteries in an unbreakable plastic case. It weighs 1-1/2 oz and has a focal length of 3-1/2" at 5x.

The square lens dimension is 1-1/4".

The 407 magnifier has the same features as the 401 MAGNA-LITE except for 10x magnification and a new wide-beam bulb.

The square lens is 1-1/4" and the focal length is 1" at 10x.



401

P/N	Description	1-23	24+
401	MAGNA-LITE 5x	\$9.75	\$8.90
407	MAGNA-LITE 10x	17.95	16.45

## EXCELTA 10x Double-Lens Illuminating Magnifier

This magnifier brilliantly illuminates and magnifies any substance, material, or specimen for inspection. It comes with a 3-1/2" double-lens system and a standard bulb. It uses 2 standard C flashlight batteries (not included).

The overall length is 6-3/4".



420

P/N	Description	1-9	10+
420	10x double-lens illuminating magnifier	\$57.35	\$52.60

## EXCELTA 10x Optical Comparator

The 10x optical comparator is a high-quality, precision-focusing magnifier that makes instant measurements of linear dimensions, angles, radii, and diameters. It can also be used as a high-power magnifier.

The comparator comes with an 1-1/2" reticle and a fitted cowhide leather case.



425

P/N	Description	1-9	10+
425	10x optical comparator	\$144.60	\$132.55

## Bausch & Lomb Magnifiers

- Lenses scientifically ground and polished from fine optical glass
- Watchmaker's loupes • Lightweight, sturdy plastic mount



81-41-70



81-41-71



81-41-72

P/N	Working Distance	Magnification	Lens Diameter	1-9	10+
81-41-70	1"	10x	1"	\$15.20	\$14.85
81-41-71	1.5"	7x	1"	12.10	11.50
81-41-72	2"	5x	1"	12.10	11.50
81-41-73	2.5"	4x	1"	12.35	11.50
81-41-08	.5", 1.25"	8x, 18x	.5", 1"	28.60	27.00
81-41-05	1.5", 2.5"	4x, 7x	.5", 1"	25.95	24.70
81-41-66	2.5"	4x	.875"	36.25	34.00

## CHEMTRONICS OPTICWIPES™

This is a soft laboratory-grade cellulose paper designed for use on optical and other sensitive surfaces.

- Packaged in a Class-100 clean-room environment
- 100% cellulose
- Highly absorbent; high wet strength
- Noncontaminating
- Solvent-resistant
- Safe on plastics
- Use to clean optical surfaces, photo-processing equipment, lab equipment, and other precision instruments



C920

P/N	Description	Each
C920	OPTICWIPES, 9" x 9", 500/box	\$27.40

## CHEMTRONICS OPTIC PREP™ Presaturated Wipes

These are the highest-quality presaturated lens-grade tissues for cleaning optical surfaces.

- Safely clean and polish optical surfaces, lenses, photographic equipment, CRT screens, and instruments
- Quick evaporation, leave no residue
- Compatible with most plastics, glass, and metals
- Mild nonabrasive solvent
- Quickly remove dust, oils, and contaminants
- Safe on plastics
- Upper-ozone-safe, CFC/HCFC-free
- Flammable



CP410

P/N	Description	Each
CP410	Presaturated wipes, 4" x 8.25" pads, 50 /box	\$15.15

## JNJ OPTISMART® Wipes

For precision optics and highly polished surfaces, JNJ's OPTISMART SMARTWIPES feature a weave of soft, microscopic polyester fibers, 1/200th the diameter of a human hair. OPTISMART wipes scoop up and trap oil and dirt between their ultra-fine fibers to safely clean finger smudges, dirt, oils, and all types of residue from delicate optical surfaces including camera lenses, microscope lenses, glasses, telescopes, and glass slides. These supersoft wipes do not scratch or smudge and can be used dry or with solvents.



0412A

P/N	Description	Each
0412A	OPTISMART wipes, 9" x 9", 200/bag	\$346.30
0412B	OPTISMART wipes, 4.5" x 4.5", 200/bag	148.50



## MAG-LITE® MAG CHARGER® SYSTEM Rechargeable Flashlight

- The most powerful hand-held flashlight of its size • Built tough enough to last a lifetime
- Rechargeable up to 1,000 times • Complete and ready to be mounted anywhere • Includes 1 each of the following: MAG CHARGER flashlight, charging unit, battery pack, 12-V-DC cigarette-lighter adapter, 110-V-AC converter, and 2 mounting brackets



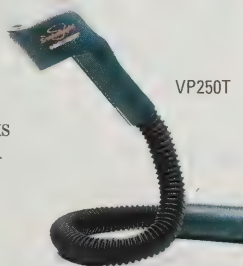
RX1019

P/N	Description	Each
RX1019	MAG CHARGER rechargeable flashlight	\$94.50

## BLACK & DECKER™ SNAKELIGHT™ and VERSAPAK™

The 3.6-V SNAKELIGHT flexible flashlight requires 1 VERSAPAK battery and charger (sold separately).

- Flexible core can be bent, coiled, or draped for hands-free convenience
- High-intensity Xenon light can be directed to brighten any task • Interchangeable battery system works with all VERSAPAK products • Charge extra batteries for nonstop power
- 2-year warranty



VP250T

P/N	Description	Each
VP250T	3.6-V SNAKELIGHT flexible flashlight	\$47.95

## 3.6-V VERSAPAK Battery

- Interchangeable battery—works with all VERSAPAK products • 360°-design guarantees correct insertion
- Grooved cap provides superior gripping surface
- Minimum life of 300 charge cycles • Designed for repetitive charging—no memory cells

P/N	Description	Each
VP100	3.6-V VERSAPAK battery	\$18.95

## VERSAPAK Starter Kit

- Includes a VERSAPAK battery and charger • Interchangeable battery system works with all VERSAPAK products • 3-hr charger with charge indicator lights
- Starter kit is ideal for all single battery-powered VERSAPAK products • Batteries have a minimum life of 300 charge cycles • Designed for repetitive charging—no memory cells • Purchase additional batteries for nonstop power

P/N	Description	Each
VP132	Starter kit with 1 battery	\$29.95
VP135	Starter kit with 2 batteries	47.95
VP150	4-port charger only	33.95

## MAG-LITE Flashlights



P/N	Description	Each
S2C016	2-C cell adjustable-beam flashlight	\$17.25
M2A016	AA adjustable-beam penlight	10.65
M3A016	AAA adjustable-beam penlight	9.10
K3A016	AAA adjustable-beam key-chain light	6.65

## EVEREADY™ Rechargeable Flashlight

- Automatically turns on when power fails • In-home security • Leaves second outlet available
- Charging indicator light (red) • 2 AA batteries (not included)
- Lifetime warranty



RC290BP

P/N	Description	Each
RC290BP	Rechargeable flashlight	\$19.25
PR48P-2	Replacement bulb	1.70

## EVEREADY ACCUSPOT® Flashlights

The ACCUSPOT flashlights have a unique XENOY® polycarbonate housing that is extremely durable yet half the weight of metal flashlights.

- Calibrated zoom focus with MEMORY LOCK™ • High-intensity bi-pin bulb • Weatherproof, corrosion-proof
- Excellent chemical resistance • Shatterproof lens
- Twist-end switch



X112WB-E

P/N	Description	Each
X112WB-E	Microbeam flashlight, uses 1 AAA battery	\$6.30
X215WB-E	Premium nonconductive flashlight, uses 2 AA batteries	8.35

## EVEREADY Industrial Alkaline Batteries

These batteries are designed for heavy-load/high-drain applications.



P/N	Size	Voltage	Each
EN92	AAA	1.5 V	\$ .80
EN91	AA	1.5 V	.80
EN93	C	1.5 V	1.30
EN95	D	1.5 V	1.45
EN22	9V	9 V	3.00

## EVEREADY ENERGIZER® Lithium Battery

A lithium battery is a reliable power source for critical applications. It offers more than twice the energy of an alkaline battery.

- Up to 10-year shelf life in foil pack • Cost-effective • Environmentally benign • 33% lighter than alkaline batteries.



L522FP

P/N	Description	Each
L522FP	9 V battery	\$6.75
L91BP-2	1.5 V battery	5.65

## EVEREADY® Industrial Penlight

- Uses 2 AAA batteries • 1-hand push-button switch • Sturdy pocket clip • Bright, concentrated beam • Medical white



6212WH

P/N	Description	Each
6212WH	AAA penlight	\$2.40



We provide reduced pricing on large-quantity orders.



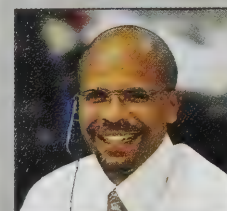
We accept fax orders 24 hours a day, 7 days a week.



We provide telephone technical assistance with your purchases.



We provide world-class quality ISO-9002-certified services and facilities.



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Help.



## PRODUCTION INDUSTRIES EZE® WORKMASTER Quick-Ship Benches

These benches are designed for general-purpose applications where a great deal of flexibility is desired. The 14/16-gauge structure supports up to a 1,000-lb distributed static load, and a 300-lb load at its edge. These benches are available in a variety of sizes and include footrests, leg extensions and a 180° rolled front edge for operator comfort. Assembly is accomplished with an ALLEN wrench (included with bench). The bench structure and accessories are painted blue, while the laminated surfaces and shelves are white in color.



P/N	Description	1	2-5	6+
70001QS	Basic bench assembly, (30" x 48")	✚ \$338.00	\$325.00	\$316.90
70002QS	Basic bench assembly, (30" x 60")	✚ 349.00	335.60	327.20
70003QS	Basic bench assembly, (30" x 72")	✚ 361.00	347.15	338.45
70005QS	Basic bench assembly, (30" x 96")	✚ 384.00	369.25	360.00
70013QS	Basic bench assembly, (36" x 72")	✚ 366.00	351.40	329.40
70015QS	Basic bench assembly, (36" x 96")	✚ 392.00	376.40	352.80
70021QS	Basic bench assembly, (30" x 48"), ESD	✚ 450.00	432.00	405.00
70022QS	Basic bench assembly, (30" x 60"), ESD	✚ 486.00	466.60	437.40
70023QS	Basic bench assembly, (30" x 72"), ESD	✚ 522.00	501.15	469.80
70025QS	Basic bench assembly, (30" x 96"), ESD	✚ 597.00	573.15	537.30
70033QS	Basic bench assembly, (36" x 72"), ESD	✚ 536.00	514.60	482.40
70035QS	Basic bench assembly, (36" x 96"), ESD	✚ 651.00	625.00	585.90

✚ Products with this symbol ship directly from the manufacturer.

### EZE WORKMASTER Bench Options

P/N	Description	1	2-5	6+
70211QS	(1) 6" drawer with lock	✚ \$121.00	\$116.20	\$108.90
70212QS	(2) 6" drawers with locks	✚ 180.00	172.80	162.00
70214QS	12" file drawer with lock	✚ 139.00	133.45	125.10
70521QS	48" instrument-shelf assembly	✚ 134.00	128.65	120.60
70522QS	60" instrument-shelf assembly	✚ 140.00	134.40	126.00
70523QS	72" instrument-shelf assembly	✚ 147.00	141.15	132.30
70531QS	48" ESD instrument-shelf assembly	✚ 206.00	197.80	185.40
70532QS	60" ESD instrument-shelf assembly	✚ 221.00	212.20	198.90
70533QS	72" ESD instrument-shelf assembly	✚ 244.00	234.25	219.60
70541QS	48" stock bin rack	✚ 21.00	20.20	18.90
70542QS	60" stock bin rack	✚ 23.00	22.10	20.70
70543QS	72" stock bin rack	✚ 25.00	24.00	22.50

✚ Products with this symbol ship directly from the manufacturer.

P/N	Description	1	2-5	6+
70554QS	12" x 48" wire shelf with brackets	✚ \$50.00	\$48.00	\$46.15
70555QS	12" x 60" wire shelf with brackets	✚ 57.00	54.75	51.30
70556QS	12" x 72" wire shelf with brackets	✚ 64.00	61.45	57.60
70561QS	48" adjustable-riser shelf	✚ 43.00	41.30	38.70
70562QS	60" adjustable-riser shelf	✚ 47.00	45.15	42.30
70563QS	72" adjustable-riser shelf	✚ 49.00	47.05	44.10
70601QS	22" upright set	✚ 58.00	55.70	52.20
70602QS	42" upright set	✚ 87.00	83.55	78.30
70652QS	4-plug brass grounding swivet	✚ 25.00	24.00	22.50
70661QS	14-outlet riser-panel set	✚ 170.00	163.20	153.00
70671QS	14-outlet riser-panel set with GFCI	✚ 209.00	200.65	188.10
70681QS	40" 8-outlet electrical strip	✚ 96.00	92.20	88.65
70682QS	48" 8-outlet electrical strip	✚ 97.00	93.15	87.30
70683QS	60" 10-outlet electrical strip	✚ 103.00	98.90	92.70
70684QS	72" 10-outlet electrical strip	✚ 105.00	100.80	94.50
70711QS	48" light with brackets	✚ 162.00	155.55	145.80
70712QS	60" light with brackets	✚ 164.00	157.45	147.60
70713QS	72" light with brackets	✚ 167.00	160.35	150.30
70719QS	36" undershelf light	✚ 82.00	78.75	73.80

NOTE: EZE WORKMASTER quick-ship benches and accessories are available through our 48-hour quick-ship program from PRODUCTION INDUSTRIES, INC. Other "non-quick-ship" sizes and accessories are available. Call for more information.

✚ Products with this symbol ship directly from the manufacturer.



Products with this symbol only ship via surface, due to weight or size.

## PRODUCTION INDUSTRIES KINATECHNICS® SYSTEM-I Single-Sided Basic Workstations

These workstations are made to be extremely durable. Many SYSTEM-I workstations have been hard at work for over 30 years and are still performing today. Designed with flexibility in mind, a single-sided workstation can easily be changed into a double-sided configuration using most of the same components. The work-surface height can be easily adjusted to 30", 33" or 36" using the optional leg-extension kit.

The work surface is 1-1/4" thick and built with a high-density commercial-grade substrate which is laminated with a tough almond-hue melamine laminate. All SYSTEM-I basic work surfaces come with a 180° rolled front edge for operator comfort. ESD work surfaces and shelves come with a factory-installed solid brass grounding terminus. Each workstation can support up to a 1,000-lb static load.

Included in a SYSTEM-I workstation are: legs, horizontal beams, vertical uprights, work surfaces, and all necessary hardware to complete one workstation. For in-line workstations, order one "starter" unit and as many "add-on" units as are needed to complete a row. For a stand-alone workstation, order one "starter" unit.



P/N	Description	1	2-5	6+
60701	36" x 48" single-sided task-center starter	✚ \$408.00	\$391.70	\$367.20
60711	36" x 48" single-sided task-center add-on	✚ 317.00	304.35	285.30
60702	36" x 60" single-sided task-center starter	✚ 414.00	397.45	372.60
60712	36" x 60" single-sided task-center add-on	✚ 329.00	315.85	296.10
60703	36" x 72" single-sided task-center starter	✚ 428.00	410.90	385.20
60713	36" x 72" single-sided task-center add-on	✚ 343.00	329.30	308.70

✚ Products with this symbol ship directly from the manufacturer.

P/N	Description	1	2-5	6+
60706	36" x 48" ESD single-sided task-center starter	✚ \$573.00	\$550.10	\$515.70
60716	36" x 48" ESD single-sided task-center add-on	✚ 486.00	466.40	437.40
60707	36" x 60" ESD single-sided task-center starter	✚ 611.00	586.60	549.90
60717	36" x 60" ESD single-sided task-center add-on	✚ 525.00	504.00	472.50
60708	36" x 72" ESD single-sided task-center starter	✚ 664.00	637.45	597.60
60718	36" x 72" ESD single-sided task-center add-on	✚ 579.00	555.85	521.10

✚ Products with this symbol ship directly from the manufacturer.

## PRODUCTION INDUSTRIES KINATECHNICS SYSTEM-I Double-Sided Basic Workstation



P/N	Description	1	2-5	6+
60721	30" x 48" double-sided task-center starter	✚ \$513.00	\$492.50	\$461.70
60731	30" x 48" double-sided task-center add-on	✚ 427.00	409.95	384.30
60722	30" x 60" double-sided task-center starter	✚ 536.00	514.60	482.40
60732	30" x 60" double-sided task-center add-on	✚ 450.00	432.00	405.00
60723	30" x 72" double-sided task-center starter	✚ 556.00	533.40	500.40
60733	30" x 72" double-sided task-center add-on	✚ 471.00	452.20	423.90
60726	30" x 48" ESD double-sided task-center starter	✚ 771.00	740.20	693.00
60736	30" x 48" ESD double-sided task-center add-on	✚ 685.00	657.50	616.50
60727	30" x 60" ESD double-sided task-center starter	✚ 838.00	804.50	754.20
60737	30" x 60" ESD double-sided task-center add-on	✚ 753.00	722.90	677.70
60728	30" x 72" ESD double-sided task-center starter	✚ 915.00	878.40	823.50
60738	30" x 72" ESD double-sided task-center add-on	✚ 828.00	794.90	745.20

✚ Products with this symbol ship directly from the manufacturer.



## PRODUCTION INDUSTRIES KINATECHNICS® SYSTEM-I Slide-Rail Workstations

This is a production-line manager's dream. The SYSTEM-I slide-rail basic unit provides the core for this double-sided, progressive, stand-alone or in-line assembly system. Boards slide smoothly and efficiently from one station to the next.



NOTE: ESD drop cloths are optional.

P/N	Description	1	2-5	6+
60781	48" Slide-Rail workstation starter	+	\$650.00	\$624.00 \$585.00
60791	48" Slide-Rail workstation add-on	+	563.00	540.50 506.70
60782	60" Slide-Rail workstation starter	+	696.00	668.20 626.40
60792	60" Slide-Rail workstation add-on	+	610.00	585.60 549.00
60786	48" ESD Slide-Rail workstation starter	+	792.00	760.40 712.80
60796	48" ESD Slide-Rail workstation add-on	+	706.00	677.80 635.40
60787	60" ESD Slide-Rail workstation starter	+	859.00	824.65 773.10
60797	60" ESD Slide-Rail workstation add-on	+	774.00	743.05 696.60

### Slide-Rails Only

P/N	Description	1	2-5	6+
60137	48" Slide-Rail (one each)	+	\$24.00	\$23.05 \$21.60
60138	60" Slide-Rail (one each)	+	31.00	29.80 27.90

### Optional Drop Cloth (ESD)

P/N	Description	1	2-5	6+
60291	48" ESD drop cloth (one each)	+	\$25.00	\$24.00 \$22.50
60292	60" ESD drop cloth (one each)	+	48.00	46.10 43.20

Products with this symbol ship directly from the manufacturer.

## PRODUCTION INDUSTRIES KINATECHNICS® SYSTEM-I Workstation Options



Some SYSTEM-I options fit the entire line, while others are adapted to very specific needs. All options provide the flexibility to optimize individual work areas.

### Terminus & Swivet ESD Grounding System

All KINATECHNICS ESD work surfaces come with a solid-brass terminus to allow proper grounding to "earth ground". The solid-brass swivet allows proper grounding of the operator as well as ESD monitoring and/or test equipment (4 plug-ins). Together they create an environment of total static control—a constant, reliable connection between the operator, the work surface laminate, and earth ground.

- Unaffected by changes in humidity and temperature
- Work surface is free of obstructions

P/N	Description	1	2-5	6+
70652QS	4-plug grounding swivet	+	\$25.00	\$24.00 \$22.50

### Overhead Lighting

The SYSTEM-I energy-saving lights are mounted 38" above the surface and provide 100 to 150 footcandles of illumination. Each unit comes with a pre-wired 8' cord, on/off switch (UL Listed) and mounting hardware. Fluorescent tubes are included.

P/N	Description	1	2-5	6+
60181	48" single-sided bench light	+	\$193.00	\$185.30 \$173.70
60182	60" single-sided bench light	+	214.00	205.45 192.60
60183	72" single-sided bench light	+	247.00	237.15 222.30
60184	48" double-sided bench light	+	366.00	351.40 329.40
60185	60" double-sided bench light	+	408.00	391.70 367.20
60186	72" double-sided bench light	+	474.00	455.60 426.60
70719QS	36" under-shelf bench light	+	82.00	78.75 73.80

### Wire Shelves (with Brackets)

Made from heavy-gauge zinc-plated wire, this shelving provides strength while it allows light to pass through for increased visibility. Its open-wire design is self-cleaning and prevents dust build-up.

P/N	Description	1	2-5	6+
60211	14" (W) x 48" (L) wire shelf, 2 straight brackets	+	\$55.00	\$52.80 \$49.50
60212	14" (W) x 60" (L) wire shelf, 2 straight brackets	+	60.00	57.60 54.00
60213	14" (W) x 72" (L) wire shelf, 2 straight brackets	+	69.00	66.25 62.10
60214	14" (W) x 48" (L) wire shelf, 2 sloping brackets	+	56.00	53.80 50.40
60215	14" (W) x 60" (L) wire shelf, 2 sloping brackets	+	61.00	58.60 54.90
60216	14" (W) x 72" (L) wire shelf, 2 sloping brackets	+	70.00	67.20 63.00

NOTE: Available in 12" widths.

Products with this symbol ship directly from the manufacturer.

### Bin Rails

Bin rails are made of heavy-gauge metal. Parts bins attach directly to the rail to provide high-volume parts storage and easy workstation accessibility. No hardware required.

P/N	Description	1	2-5	6+
60251	48" bin rail	+	\$16.00	\$15.40 \$14.40
60252	60" bin rail	+	21.00	20.20 18.90
60253	72" bin rail	+	26.00	25.00 23.40

### Holders

P/N	Description	1	2-5	6+
20343	KIMWIPE/large-bottle holder	+	\$19.00	\$18.25 \$17.10
20351	Single-solder-spool holder	+	24.00	23.05 21.60

### Electrical Strips

All electrical strips come with an 8' cord. They are UL Listed with a 15 amp circuit breaker, on/off switch, and a pilot light. Each strip is beige and comes with mounting hardware.

P/N	Description	1	2-5	6+
60281	48" 8-outlet electrical strip	+	\$97.00	\$93.15 \$87.30
60282	60" 10-outlet electrical strip	+	103.00	98.90 92.70
60283	72" 10-outlet electrical strip	+	105.00	100.80 94.50

### Drawers

All drawers are made of 14-ga metal and can be attached to each other with the included hardware.

P/N	Description	1	2-5	6+
60171	6" drawer	+	\$107.00	\$102.75 \$96.30
60173	12" drawer	+	125.00	120.00 112.50
60175	Two 6" drawers in a 12" shell	+	173.00	166.10 155.70
60172	Single-sided drawer bracket kit	+	24.00	23.05 21.60

NOTE: Only one single-sided drawer bracket kit is required when attaching drawers to a single-sided bench. For attaching drawers to left and right side, two are needed.

### Leg Extender

The extender allows the work-surface height to be adjusted to 30", 33" or 36".

- Need 2 sets per bench

P/N	Description	1	2-5	6+
60009	Leg extender (1 set)	+	\$22.00	\$21.15 \$19.80

### Footrest Tubes and Shelves

The footrest shelf provides storage for personal items and bulk storage materials while reducing operator fatigue. It's made of durable welded wire, is zinc-plated. Self-cleaning.

P/N	Description	1	2-5	6+
60221	48" (L) footrest tube	+	\$35.00	\$33.60 \$31.50
60222	60" (L) footrest tube	+	42.00	40.35 37.80
60223	72" (L) footrest tube	+	50.00	48.00 45.00
60231	48" (L) x 11" (W) single-sided footrest shelf	+	50.00	48.00 45.00
60232	60" (L) x 11" (W) single-sided footrest shelf	+	59.00	56.65 53.10
60233	72" (L) x 11" (W) single-sided footrest shelf	+	71.00	68.20 63.90
60234	48" (L) x 23" (W) double-sided footrest shelf	+	53.00	50.90 47.70
60235	60" (L) x 23" (W) double-sided footrest shelf	+	61.00	58.60 54.90
60236	72" (L) x 23" (W) double-sided footrest shelf	+	73.00	70.10 65.70

Products with this symbol ship directly from the manufacturer.



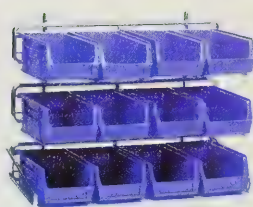
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## PRODUCTION INDUSTRIES 3-Tier Parts-Bin Assembly Rack

60276



P/N	Description	Each
60276	Frame kit (bins not included)	\$72.00
30-220-BLUE	Non-ESD bin, blue (AKRO-MILS)	2.00
SB90743CAS	Conductive bin, black (OLYMPIC)	3.25
SB90743BAS	Antistatic bin, blue (OLYMPIC)	3.25

## PRODUCTION INDUSTRIES SPACESTATION Workstation

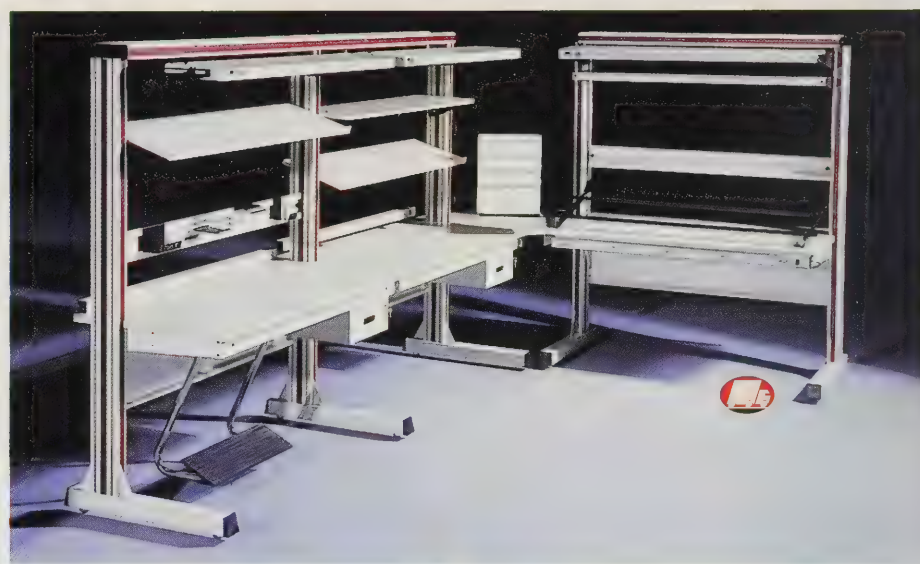


The SPACESTATION reflects the ultimate in style and performance. At the top of the line in the workbench industry, the SPACESTATION offers these features:

- Ergonomic design satisfies various personnel
- Infinite adjustability • 6063 T5 extruded aluminum uprights • Independent height adjustment on double-sided stations • Upgraded high quality ball-bearing drawer slides • Stand-alone or starter/add-ons to maximize floor space • Surfaces come with a 180° rolled front edge for operator comfort • UL Listed electrical strips, ESD, air, power, and cabinets are optional

A SPACESTATION starter unit includes uprights, work surfaces, a work-surface frame, and a utility channel. Each utility channel comes with 2 duplex outlets already installed. For in-line workstations order 1 "starter" unit and as many "add-on" units as are needed to complete a row. For a stand-alone workstation, order 1 "starter unit". Colors for SPACESTATION benches are as follows: ivory paint, beige laminate, and burgundy trim strips.

P/N	Description	1-9	10+
20901	30" x 48" double-sided SPACESTATION starter	\$1069.00	\$1026.25
20902	30" x 60" double-sided SPACESTATION starter	1097.00	1053.15
20903	30" x 72" double-sided SPACESTATION starter	1148.00	1102.10
20911	30" x 48" double-sided SPACESTATION add-on	877.00	841.95
20912	30" x 60" double-sided SPACESTATION add-on	904.00	867.85
20913	30" x 72" double-sided SPACESTATION add-on	956.00	917.80



P/N	Description	1-9	10+
20921	30" x 48" single-sided SPACESTATION starter	786.00	754.60
20922	30" x 60" single-sided SPACESTATION starter	810.00	777.60
20923	30" x 72" single-sided SPACESTATION starter	835.00	801.60
20931	30" x 48" single-sided SPACESTATION add-on	607.00	582.75
20932	30" x 60" single-sided SPACESTATION add-on	630.00	604.80
20933	30" x 72" single-sided SPACESTATION add-on	656.00	629.80
20941	30" x 48" ESD double-sided SPACESTATION starter	1292.00	1240.35
20942	30" x 60" ESD double-sided SPACESTATION starter	1371.00	1316.20
20943	30" x 72" ESD double-sided SPACESTATION starter	1472.00	1413.15
20951	30" x 48" ESD double-sided SPACESTATION add-on	1099.00	1055.05
20952	30" x 60" ESD double-sided SPACESTATION add-on	1178.00	1130.90
20953	30" x 72" ESD double-sided SPACESTATION add-on	1279.00	1227.85
20961	30" x 48" ESD single-sided SPACESTATION starter	898.00	862.10
20962	30" x 60" ESD single-sided SPACESTATION starter	947.00	909.15
20963	30" x 72" ESD single-sided SPACESTATION starter	996.00	956.20
20971	30" x 48" ESD single-sided SPACESTATION add-on	719.00	690.25
20972	30" x 60" ESD single-sided SPACESTATION add-on	767.00	736.35
20973	30" x 72" ESD single-sided SPACESTATION add-on	817.00	784.35

### SPACESTATION Accessories

P/N	Description	1-9	10+
20091	Corner top	\$171.00	\$164.20
20099	ESD corner top	284.00	272.65
20111	Footrest pan	41.00	39.40
20121	48" footrest	54.00	51.85
20122	60" footrest	62.00	59.55
20123	72" footrest	69.00	66.25

☞ Products with this symbol ship directly from the manufacturer.

P/N	Description	1-9	10+
20131	48" light with brackets, ivory	\$222.00	\$213.15
20132	60" light with brackets, ivory	229.00	219.85
20133	72" light with brackets, ivory	239.00	229.45
20171	14" x 48" laminated steel shelf	97.00	93.15
20172	14" x 60" laminated steel shelf	104.00	99.85
20173	14" x 72" laminated steel shelf	111.00	106.60
20174	18" x 48" laminated steel shelf	100.00	96.00
20175	18" x 60" laminated steel shelf	107.00	102.75
20176	18" x 72" laminated steel shelf	114.00	109.50
20211	48" stock-bin rack	44.00	42.25
20212	60" stock-bin rack	47.00	45.15
20213	72" stock-bin rack	52.00	49.95
20221	48" slide-rail system	99.00	95.05
20222	60" slide-rail system	104.00	99.85
20223	72" slide-rail system	109.00	104.65
20241	48" slide-rail with hardware	20.00	19.20
20242	60" slide-rail with hardware	22.00	21.20
20243	72" slide-rail with hardware	25.00	24.00
20281	Utility air system	74.00	71.05
20311	48" overhead-trolley system	95.00	91.20
20312	60" overhead-trolley system	103.00	98.90
20313	72" overhead-trolley system	110.00	105.60
20342	Single-air quick-connect	29.00	27.85
20343	KIMWIPE bottle holder	19.00	18.25
20345	Instruction holder	81.00	77.80
20347	LUXO light bracket	18.00	17.30
20350	Side-rack assembly	166.00	159.40
20351	Single solder-spool holder	24.00	23.05
20352	Dual solder-spool holder	34.00	32.65
20353	Soldering-iron stand	67.00	64.35
20356	Clip-on tool holder	20.00	19.20
20361	CRT tray	140.00	134.40
20362	Keyboard tray	42.00	40.35
20611	(1) 6" drawer with lock	121.00	116.20
20612	(2) 6" drawers with locks	180.00	172.80
20614	12" file drawer with lock	139.00	133.45
20681	40" 8-outlet electrical strip	96.00	92.20
20682	48" 8-outlet electrical strip	97.00	93.15
20683	60" 10-outlet electrical strip	103.00	98.90

☞ Products with this symbol ship directly from the manufacturer.



Need Help?  
Just Call.



Products with this symbol only ship via surface, due to weight or size.



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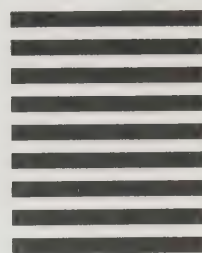
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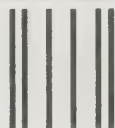
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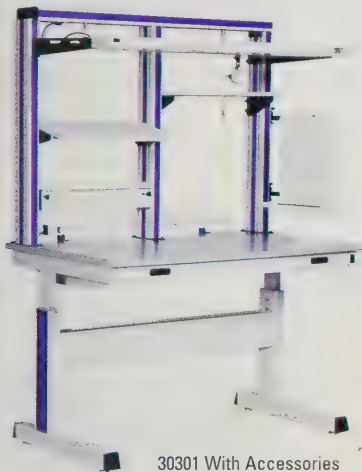




## PRODUCTION INDUSTRIES Ergonizer Workstation

- Single-sided workstation, 60" (W) x 36" (D)
- Work surface has a 180° rolled front edge for operator comfort • Single-button, motor-driven, hydraulic-lift system • 1,000-lb static-load capacity
- Work-surface height adjusts from 31" to 43"
- Optional heavy-duty aluminum-extrusion uprights • Accessories easily mount to the uprights and are infinitely adjustable • Comes standard in a light grey frame with an ESD or non-ESD grey laminated work surface

**NOTE:** All workstations and accessories shown are manufactured by PRODUCTION INDUSTRIES, INC. Call for more information and catalogs on additional Production Industries workstations and accessories not shown.



30301 With Accessories



Complete Benches Ship by Truck Only

P/N	Description		1-9	10+
30301	Motorized-bench assembly, 36" x 60"	+	\$2638.00	\$2532.50
30305	Vertical assembly (3)	+	556.00	533.80
30306	Vertical assembly (2)	+	391.00	375.40
30311	Utility system	+	194.00	186.25
30321	Half-size shelf	+	53.00	50.90
30323	Full-size shelf	+	71.00	68.20
30331	Half-size stock-bin rack	+	15.00	14.40
30333	Full-size stock-bin rack	+	31.00	29.80
30351	Light assembly	+	239.00	229.50
30361	Overhead-trolley system	+	103.00	98.90
20281	Utility air system	+	74.00	71.05
20343	KIMWIPES bottle holder	+	19.00	18.25
20345	Instruction holder	+	81.00	77.80
20347	LUXO light bracket	+	18.00	17.30
20350	Side-rack assembly	+	166.00	159.40
20351	Single solder-spool holder	+	24.00	23.05
20352	Dual solder-spool holder	+	34.00	32.65
20353	Soldering-iron stand	+	67.00	64.35
20356	Clip-on tool holder	+	20.00	19.20
30411	(1) 6" drawer with lock	+	121.00	116.20
30412	(2) 6" drawers with locks	+	180.00	172.80
30414	12" file drawer with lock	+	139.00	133.45
70682	48" 6-outlet electrical strip	+	97.00	93.15

Products with this symbol ship directly from the manufacturer.

## PRODUCTION INDUSTRIES EZE WORKMASTER Motorized Cantilever Bench (MCB)

The MCB lift system is powered by an intermittent motor (115 V AC, 60 Hz, 1.5 amp, 1/10 HP). The motor is operated by a single toggle-type push button located in the front beam. The rate of travel is 1/4" per second.



70102 With Accessories

- Height adjustable from 30" to 42" • Overload protection and limit switches • Nontoxic hydraulic fluid
- 750-lb distributed static-load capacity • Lift system completely enclosed • Motor UL Listed • Work surface has 180° front edge • Uses standard EZE WORKMASTER accessories



Complete Benches Ship by Truck Only

P/N	Description		1-9	10+
70101	36" x 48" MCB	+	\$1438.00	\$1380.50
70102	36" x 60" MCB	+	1452.00	1393.95
70103	36" x 72" MCB	+	1467.00	1408.35
70104	36" x 48" ESD MCB	+	1567.00	1504.35
70105	36" x 60" ESD MCB	+	1597.00	1533.15
70106	36" x 72" ESD MCB	+	1660.00	1593.60
70111	30" x 48" MCB	+	1429.00	1371.85
70112	30" x 60" MCB	+	1443.00	1385.30
70113	30" x 72" MCB	+	1457.00	1408.40
70114	30" x 48" ESD MCB	+	1525.00	1464.00
70115	30" x 60" ESD MCB	+	1558.00	1495.70
70116	30" x 72" ESD MCB	+	1583.00	1519.70

Products with this symbol ship directly from the manufacturer.

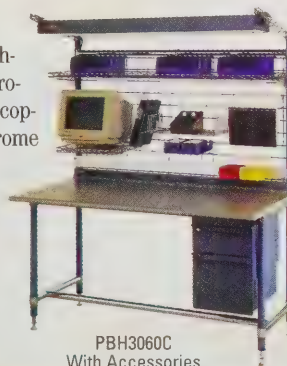


Products with this symbol only ship via surface, due to weight or size.

## INTERMETRO Workbench System

Built-in flexibility allows this workbench system to be changed as your needs change—making it an excellent value. Furthermore, the bench's accessory-grid format allows it to be easily customized for maximum efficiency.

The system utilizes a rounded tubular frame that's sturdy, tough, and reduces dust accumulation. To ensure proper ergonomic interaction between the workbench and the worker, the system comes in low- or high-profile models and includes height adjustability and a reversible footrest as standard features. Basic benches include the low-profile model with telescoping legs, top, and chrome foot-rest. The high-profile model adds rear standards with mounting slots and a chrome top stringer. A static-dissipative ESD top is also available.



PBH3060C  
With Accessories

P/N	Profile	Top Material	Width/Length/Height	Each
PBL3060L	Low	Plastic laminate	32-1/4" x 60" x 33"	\$570.00
PBL3060C	Low	ESD laminate	32-1/4" x 60" x 33"	960.00
PBL3072L	Low	Plastic laminate	32-1/4" x 72" x 33"	690.00
PBL3072C	Low	ESD laminate	32-1/4" x 72" x 33"	1080.00
PBH3060L	High	Plastic laminate	32-1/4" x 60" x 69"	760.00
PBH3060C	High	ESD laminate	32-1/4" x 60" x 69"	1150.00
PBH3072L	High	Plastic laminate	32-1/4" x 72" x 69"	880.00
PBH3072C	High	ESD laminate	32-1/4" x 72" x 69"	1270.00

Products with this symbol ship directly from the manufacturer.



Complete Benches Ship by Truck Only

### Drawers

P/N	Description	Width/Length/Height	Each
PBA-SD6D	Starter	12" x 19-1/2" x 5-3/4"	\$126.00
PBA-AD6D	Add-on	12" x 19-1/2" x 5-3/4"	126.00
PBA-SD12D	Starter	12" x 19-1/2" x 10-3/4"	147.00
PBA-AD12D	Add-on	12" x 19-1/2" x 10-3/4"	147.00

NOTE 1: To order the optional lock, add L to the end of a drawer's model number (e.g., PBA-SD12DL).

NOTE 2: Add-on drawers can only be added to the 6" starter and not the 12".

Products with this symbol ship directly from the manufacturer.

### Accessories

P/N	Description	Each
PBA-60PQ	Power-outlet strip	\$98.00
PBA-LA6Q	Light assembly	375.00
PBA-1260CQ	Cantilevered shelf	59.40
PBA-BBCQ	Bin rail	36.00
PBA-GPCQ	Grid panel	55.00
PBA-GSD	Grid shelf	38.00
PBA-MS	Monitor shelf	39.00
PBA-PFH	Hanging-file holder	17.00
PBA-CHD	Catalog/file holder	20.00
PBA-1BH	Bin holder (11")	16.00
PBA-2BH	Bin holder (22")	22.00

NOTE 1: To order a power strip with a bench add P to the end of the bench's model number (e.g., PBL3072LP). To order just the power strip, use the accessory model number only.

NOTE 2: The light assembly, cantilevered and slanted cantilevered shelves, and bin rail can be mounted directly to the high-profile bench. The grid panel (PBA-GPCQ) is required to mount the holders for a standard shelf, monitor shelf, hanging file folders, catalog/file folders, and bins.

Products with this symbol ship directly from the manufacturer.



# PRO-LINE Workstations

These are heavy-duty, high-quality workstations that come at an affordable price.

They can be configured to meet a variety of individual needs through the use of their extensive selection of modular accessories. To reduce the user's contact with sharp edges, the workstations feature "T"-mold edgings—they come in conjunction with the laminate tops and drawer fronts. The tops are available in standard laminate or conductive surfaces. The standard work surface and

drawer fronts are white with black "T"-mold edgings. The frame colors include: light blue, light grey, and light beige.

## HD Workstation

This is an independent, heavy-duty, 4-leg workstation with 2"-square tube legs. It is the workstation of choice for production and lab areas at many FORTUNE 500 companies. The standard height is 30".

## CHD Workstation

The CHD, like the HD, offers the mobility of an independent workstation but also provides recessed front legs for user leg clearance and

comes standard with a modesty panel. The standard height of the CHD is 30".

## ERGO-LINE Workstations

These workstations allow users of all sizes and physical characteristics to change the height of the work surface at will. Changing positions during the work process can greatly reduce repetitive-motion injuries and increase productivity.

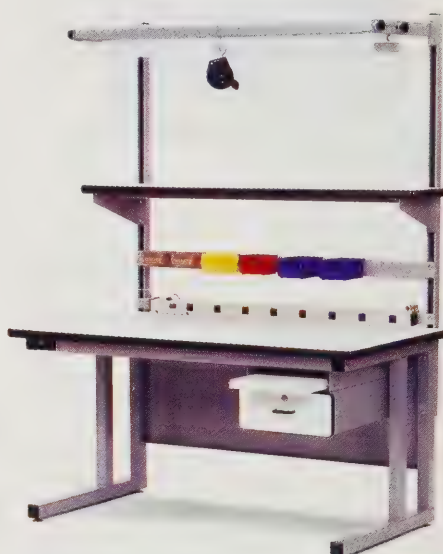
- Adjustable height (30"–42") • 330-lb capacity



Products with this symbol only ship via surface, due to weight or size.



HD Workstation



CHD Workstation



ERGO-LINE Workstation



Basic Bench, Top: 60" x 30"			
P/N	HD Workstation		Each
HD6030P	Plastic	+	\$305.00
HD6030C	Conductive	+	410.00
CHD Workstation			
CHD6030P	Plastic	+	\$368.00
CHD6030C	Conductive	+	473.00
ERGO-LINE Workstation			
EL6030P	Plastic	+	\$1012.00
EL6030C	Conductive	+	1117.00
Optional Accessories			
CSPL1260P	12" shelf, plastic	+	\$103.00
CSPL1260ESD	12" shelf, ESD	+	145.00
OLF60	Light frame	+	179.00
BH60	Bin holder	+	25.00
FR60	Footrest	+	30.00
LTF60	Tool-suspension frame, 60"	+	76.00
ESMR60	Electrical mounting rail	+	26.00

NOTE: Specify frame color (beige, blue, or grey).

✚ Products with this symbol ship directly from the manufacturer.

Basic Bench, Top: 72" x 30"			
P/N	HD Workstation		Each
HD7230P	Plastic	+	\$336.00
HD7230C	Conductive	+	462.00
CHD Workstation			
CHD7230P	Plastic	+	\$404.00
CHD7230C	Conductive	+	530.00
ERGO-LINE Workstation			
EL7230P	Plastic	+	\$1064.00
EL7230C	Conductive	+	1190.00
Optional Accessories			
CSPL1272P	12" shelf, plastic	+	\$116.00
CSPL1272ESD	12" shelf, ESD	+	166.00
OLF72	Light frame	+	189.00
BH72	Bin holder	+	28.00
FR72	Footrest	+	33.00
LTF72	Tool-suspension frame, 72"	+	81.00
ESMR72	Electrical mounting rail	+	28.00

NOTE: Specify frame color (beige, blue, or grey).

✚ Products with this symbol ship directly from the manufacturer.

Optional Accessories for Both Sizes			
P/N	Description		Each
UR60	Accessory supports	+	\$49.00
ES48	Powerstrip, 8 outlets	+	60.00
MDS-6	6" (H) drawer	+	126.00
MDS-12	12" (H) drawer	+	157.00
HK	Drawer hanging kit	+	18.00
SGK-J2	Ground kit	+	40.00
MA-1	Monitor arm	+	119.00
ABH-1	Articulating bin holder	+	205.00
POWS	Pull-out writing shelf	+	115.00
AQDC	Air quick-disconnect	+	17.00
HDLE-6	6" leg extenders (HD only)	+	66.00
TB-2	Tool balancer	+	52.00

NOTE: Specify frame color (beige, blue, or grey).

✚ Products with this symbol ship directly from the manufacturer.



Products with this symbol ship directly from the manufacturer.



## EckAdams EASI® Ergonomic Seating

Because proper seating is essential to worker comfort and productivity, we incorporate ergonomically-designed pneumatic controls to adjust seat height, seat tilt, and back tilt.

- Available in three heights



P/N	Description	Fabric Color	Seat Height		1-9	10-19	20+
8400-330-63	Task chair, black frame	Blue	16" to 20"-3/4"	+	\$193.35	\$178.50	\$165.75
8478-330-14	Mid-height task chair, chrome frame	Blue	19-1/2" to 27-1/4"	+	276.70	255.40	237.15
8488-330-14	Counter-height task chair, chrome frame	Blue	22" to 32"	+	283.35	261.55	242.90

Products with this symbol ship directly from the manufacturer.

## ESD Production Stools with Conductive Fabric

P/N	Description	Fabric Color	Seat Height		1-9	10-19	20+
8730-941	Conductive task chair, chrome frame	Blue	16" to 20-3/4"		\$316.70	\$292.35	\$271.50
8778-941-36	Conductive mid-height task chair, chrome frame	Blue	19-1/2" to 27-1/4"		396.70	366.20	340.00
8788-941-36	Conductive counter-height task chair, chrome frame	Blue	22" to 32"		403.35	372.35	345.75

## EckAdams TuffOne™ and TuffOne II™ Series Ergonomic Task Chairs

Featuring an enhanced-back and seat-support system, and heavy-duty controls, the TuffOne and TuffOne II Series chairs are built to endure multiple-work-shift usage. Overall larger dimensions, pneumatic seat-height adjustment, and waterfall-front seats are standard—providing optimum intensive-use performance and around-the-clock reliability and comfort.

The TuffOne 3500 Series not only meets ANSI/BIFMA durability standards, it also meets the GSA intensive-use specification (FNEW 83-269E). The TuffOne Series chairs feature an ESD-safe fabric. TuffOne II chairs feature an easy-lift back-height adjustment.

- Constructed of superior materials that provide increased durability without skimping on comfort
- Frame available with an attractive black powder-coat finish
- 7-year warranty



P/N	Description	Fabric Color	Seat Height		1-9	10-19	20+
<b>ESD TuffOne Models with Conductive Fabric</b>							
3523C-941	High-back task chair	Blue	16"-21"	+	\$493.35	\$455.40	\$422.85
3598C-941-36	Mid-height task chair	Blue	20"-27-3/4"	+	533.35	492.35	457.15
3599C-941-36	Counter-height task chair	Blue	23"-33"	+	546.70	504.65	468.60

### Non-ESD TuffOne II Models

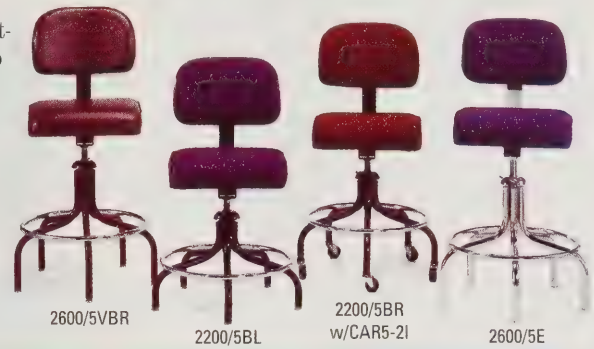
4498-330-14	Mid-height task chair	Navy blue	20-1/4"-27-3/4"	+	426.70	394.00	365.75
4499-330-14	Counter-height task chair	Navy blue	23"-33"	+	433.35	400.00	372.00

Products with this symbol ship directly from the manufacturer.

## BEVCO 2000 Series Production Seating

The low price of these chairs makes them ideal when you don't have a big budget for nonproduction equipment.

- Available in vinyl, fabric and vinyl, or conductive (ESD) fabrics • Optional single-wheel hard-floor casters add 2.5" to seat height (must be specified at time of order)



P/N	Base	Upholstery	Color	Seat Height	1	2-9	10+
2200/5VBR	Nonconductive	Vinyl	Brown	19"-24.5"	\$147.75	\$119.15	\$102.25
2200/5BR	Nonconductive	Vinyl and fabric	Brown/brown	19"-24.5"	145.95	122.70	105.30
2200/5VBL	Nonconductive	Vinyl	Navy blue	19"-24.5"	147.75	119.15	102.25
2200/5BL	Nonconductive	Vinyl and fabric	Navy blue/blue	19"-24.5"	147.75	119.15	102.25
2600/5VBR	Nonconductive	Vinyl	Brown	24"-29.5"	145.95	122.70	105.30
2600/5BR	Nonconductive	Vinyl and fabric	Brown/brown	24"-29.5"	145.95	122.70	105.30
2600/5VBL	Nonconductive	Vinyl	Navy blue	24"-29.5"	145.95	122.70	105.30
2600/5BL	Nonconductive	Vinyl and fabric	Navy blue/blue	24"-29.5"	145.95	122.70	105.30
CAR5-2I	Nonconductive casters, set of 5 with inserts				25.10	—	—

### ESD Seating with Conductive Fabric

2200/5E	Conductive	Conductive fabric	Navy blue	19"-24.5"	212.65	178.80	153.40
2600/5E	Conductive	Conductive fabric	Navy blue	24"-29.5"	219.00	184.15	158.00
CAR5-EI	Conductive casters, set of 5 with inserts				35.64	—	—

It's better than fabric . . . it's better than vinyl.

## BEVCO® 7000 Series Polyurethane Seating

- Rugged polyurethane is the same material used in the steering wheel of your car—but enhanced for seating comfort and static control • ESD models (E suffix) have drag chain, ESD glides, and surface resistivity of 10<sup>8</sup> Ω • ESD/clean-room models (ECR suffix) are Class-10 clean-room certified • 4-way manual backrest adjustment (tilt models also available)



### ESD Models—Chrome-Plated Metal Components

P/N	Base Style	Foot Ring	Seat Height	1	2-9	10+
7200E	Tubular steel	Welded/fixed	19"-24"	\$279.60	\$235.10	\$201.75
7500E	Aluminum	Adjustable	22"-32"	316.50	266.15	228.35
7600E	Tubular steel	Welded/fixed	24"-29"	284.05	238.85	204.95

### ESD/Clean-Room Models—Chrome-Plated Metal Components

P/N	Base Style	Foot Ring	Seat Height	1	2-9	10+
7200ECR	Tubular steel	Welded/fixed	19"-24"	\$277.50	\$238.75	\$209.75
7500ECR	Aluminum	Adjustable	22"-32"	308.70	269.75	240.55
7600ECR	Tubular steel	Welded/fixed	24"-29"	278.90	240.00	210.80

### Nonconductive Models—Painted Black, Chrome-Plated Foot Ring

P/N	Base Style	Foot Ring	Seat Height	1	2-9	10+
7200	Tubular steel	Welded/fixed	19"-24"	\$200.00	\$168.20	\$144.30
7500	Aluminum	Adjustable	22"-32"	204.65	176.30	151.30
7600	Tubular steel	Welded/fixed	24"-29"	201.45	169.40	145.35

### Optional Dual-Wheel Casters—Add 1" to Seat Heights

P/N	Description	Each
CARD5	ESD hard-floor casters (set of 5)	\$32.05
CADS/5	Non-ESD hard-floor casters (set of 5)	19.95

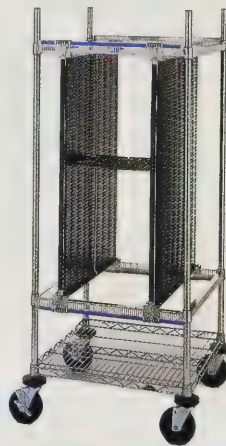


## INTERMETRO CBX Universal PCB Truck

METRO's universal PCB truck offers board manufacturers a complete PCB handling and storage system with the flexibility to adapt to their needs as rapidly as they change. The unique design of the CBX panels allows board transport and storage in any one of 3 orientations (horizontal, slanted, or vertical).

- Positive panel-adjustment method (patent pending)
- 3-way CBX panel allows boards to be stored horizontally, slanted, or vertically on the same cart
- Compact footprint (24" x 24" and 24" x 36") utilizes less floor space than other trucks
- Horizontal slot spacing: 1/2" (on center)
- No panel slippage to allow a board "crash"
- Allows for horizontal storage of 65 PCBs per bay

Each cart consists of: 4 posts, 4 poly casters (2 brake, 2 swivel), 1 chrome-wire bottom shelf, 2 CBX end panels, and a grounding cable.



CBX515EC

P/N	OD	Approx. Max. PCB Size		1	2-4	5+
CBX515EC	26" x 26" x 60"	17" x 24"	+	\$1100.00	\$916.70	\$785.75
CBX535EC	26" x 38" x 60"	4" x 29"	+	1200.00	1000.00	875.15

### ACCESSORIES

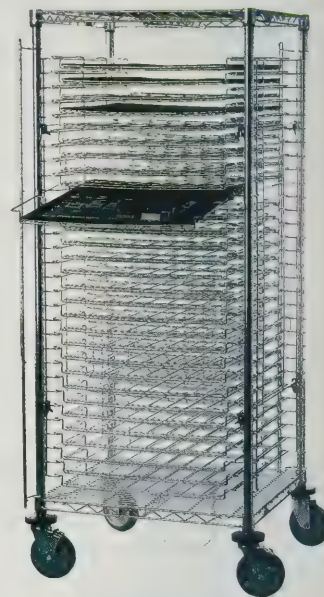
P/N	Description		1	2-4	5+
CBXP2	Double-sided panel	+	\$410.00	\$341.70	\$292.85
CBX51VHK	Vertical-hold panel kit for CBX515	+	175.00	145.85	125.00
CBX53VHK	Vertical-hold panel kit for CBX535	+	263.00	219.20	187.85

Products with this symbol ship directly from the manufacturer.

## INTERMETRO PCB Pallet Cart System

This system is specifically designed and built to address the needs of today's circuit-board manufacturers who need the flexibility to handle various sizes and shapes of boards without taking up valuable floor space. It provides a safe and efficient method for transporting and storing PCBs throughout the fabrication process. INTERMETRO's PCB pallets are designed to accommodate boards with no visible edge for capture and unconventionally-shaped boards. Each pallet can be transported or stored in a specially-designed cart which comes standard with a grounding cable and retractable pallet stops.

- Cart comes complete with ground cord and is ESD-safe
- Optional conductive foam mat available for pallets
- Cart: 24" (L) x 24" (W) x 60" (H)
- Pallet: 20-5/8" (L) x 17-7/8" (ID) x 1" (H)



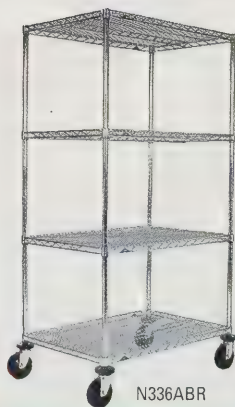
PPC515QC, CP51C, M-36050

P/N	Description		1	2-4	5+
PPC515QC	PCB pallet cart	+	\$420.00	\$350.00	\$300.00
CP51C	Pallet	+	26.00	22.05	18.60
P/N	Description		1-9	10-19	20+
M-36050	High-density, conductive foam mat for pallet	+	\$10.00	\$9.25	\$8.60

Products with this symbol ship directly from the manufacturer.

## INTERMETRO Mobile-Storage Unit

- 68" overall height
- 4 chrome or bright zinc wire shelves
- 4 resilient stem/swivel casters
- Maximum-load capacity of 800 lb per shelf
- Also available in stainless-steel wire and solid shelves



N336ABR

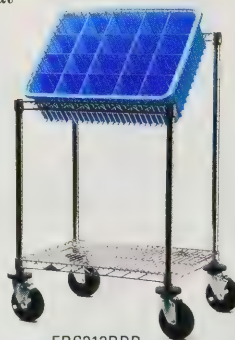
P/N	Description	Finish		1	2-4	5+
N336ABR	18" (W) x 36" (L)	Brite	+	\$339.00	\$287.30	\$242.15
N536ABR	24" (W) x 36" (L)	Brite	+	375.00	317.80	267.90
N336AC	18" (W) x 36" (L)	Chrome	+	353.00	299.20	252.15
N536AC	24" (W) x 36" (L)	Chrome	+	397.00	336.45	283.60

Products with this symbol ship directly from the manufacturer.

## INTERMETRO Bench-Side Tote Cart

INTERMETRO's bench-side tote cart allows workers to position bins, totes, cartons, boxes, or sub-assemblies at an angle that is conducive to repetitive pick-and-place operations. Each unit comes with a 45° slanted top shelf, standard SUPER ERECTA SHELF at the bottom, two brake casters, aluminum split sleeves, and a drag chain for instances when static dissipation is an issue.

- 45° slanted top shelf with 4" front ledge
- 18" (W) x 24" (L) footprint uses minimal floor space
- Tote box sold separately



EBC313BBR

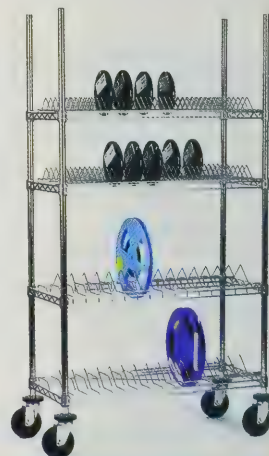
P/N	Description		1	2-4	5+
EBC313BBR	Bench-side tote cart	+	\$274.00	\$232.25	\$195.75

Products with this symbol ship directly from the manufacturer.

## INTERMETRO Surface Mount Component Reel Shelving

METRO's SMT component-reel shelving provides efficient storage and transport for 7", 13" and 15" surface-mount component reels. These SUPER ERECTA BRITE™ plated shelves can be mixed and matched with standard SUPER ERECTA shelving, posts, and casters to create a reel-handling and storage system to address the exacting needs of PCB manufacturers.

- Assembles with standard INTERMETRO posts and casters
- Finish: Bright zinc



P/N	Size		1-9	10-24	25+
R1836BR-7	18" (W) x 36" (L) reel shelf for 7" reels (cap.= 78 reels on 3/4" ctrs.)	+	\$74.00	\$62.75	\$52.90
R1836BR-13	18" (W) x 36" (L) reel shelf for 13" and 15" reels (cap.=15 reels on 2" ctrs.)	+	68.00	57.65	48.60

NOTE: Posts, casters and reels not included.



Need Help?  
Just Call  
Toll-Free.



Products with this symbol ship directly from the manufacturer.



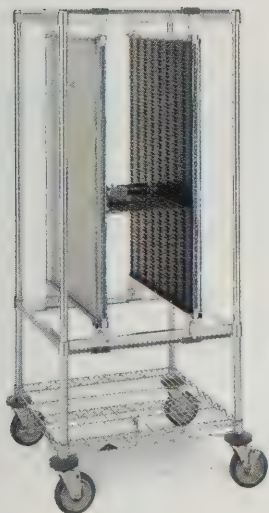
We accept fax orders 24 hours a day, 7 days a week.



We provide telephone technical assistance with your purchases.



# Finding The Right Solution Has Never Been Easier.



## Universal PCB Cart

Allows board transport and storage in any one of 3 orientations: horizontal, vertical, or at a 45° angle.

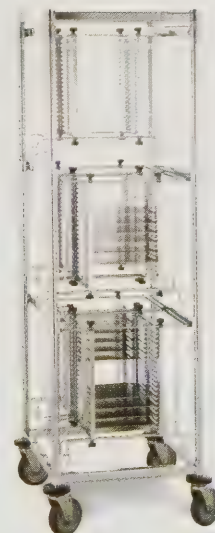


## Work-In-Process Cart

In a manufacturing or assembly application, sub-assemblies or components can be efficiently transported on Super Erecta or Super Adjustable\* carts in conjunction with Olympic totes.

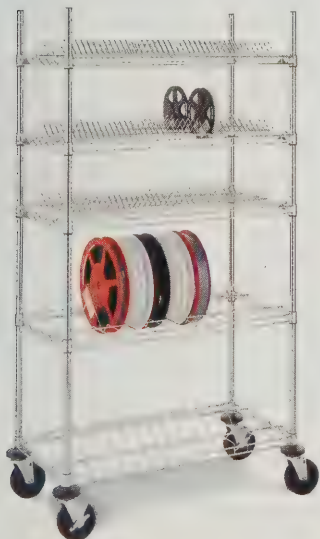
## \*Introducing... Super Adjustable Super Erecta®.

An ESD-safe system that offers "tool-free", easy shelf adjustment in seconds.



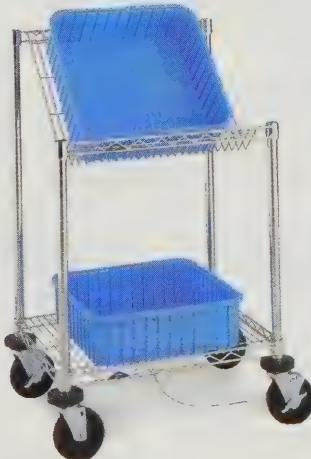
## Slide Truck with PCB Carriers

Slide Trucks provide positive holding and easy vertical relocation of circuit board carriers. Chrome-plated carriers adjust to accommodate various-sized boards. Truck also accepts Olympic TB93000 series totes.



## Surface Mount Reel Shelves

An efficient method of storage and transport for standard size component reels. Provides efficient storage for 7", 13", and 15" (178, 330, and 381mm) surface mount component reels.



## Benchside Tote Cart

Allows workers to position bins, totes, cartons, boxes, or sub-assemblies at an angle conducive to repetitive pick-and-place operations.



## MetroMax Q ESD

An ESD-safe storage and transport shelving system that features cushioned polymer mats for the protection of sensitive electronic components.

## Just choose the products that bear the METRO® name.

These versatile cart systems are designed to provide safe, reliable, and durable protection for your parts in process. Available in a complete range of styles, finishes, and accessories, units are easy to assemble and easy to clean.

So it's easy to choose the right solution to perfectly meet your needs.

For information, see our products in this catalog.

For additional information please visit the @Once web site at [www.4atonce.com](http://www.4atonce.com) or call (800) 261-9602, Ext. 4002.

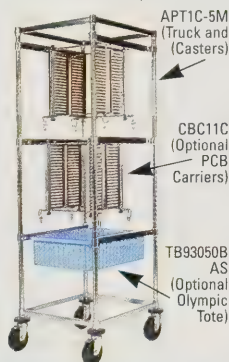


We put space to work.™



## INTERMETRO Adjustable Slide Truck

- Adjustable from 20-5/8" to 29-3/8" x 26"; 68" overall height with casters
- Comes with 5" resilient stem/ swivel caster
- Shown with optional CBC11C carrier and OLYMPIC TB 93050BAS (ESD anti-static tote box)
- Designed to store and transport carriers or tote boxes
- Can be made conductive with optional grounding bracket



P/N	Description	1-9	10-24	25+
APT1C-5M	PT truck (truck only)	+	\$476.00	\$403.40 \$340.00
GCB16S	Grounding bracket	+	32.00	27.15 22.90
TB93050BAS	Optional ESD tote box, 20-1/8" (L) x 15-1/8" (W) x 4-1/2" (D)	+	30.80	25.70 22.00

## INTERMETRO Printed-Circuit-Board Carriers (Optional)

- Side panels adjust to exact width of boards
- Conductive chrome-plated carbon steel throughout
- Available in 3 sizes, each holds a maximum of 20 boards
- Optional center panels and tote box increase carrier capacity

P/N	Length	Width	Height	Max. Board Size	1-9	10-24	25+
CBC11C	17-1/2"	12-1/2"	18-3/16"	13" x 12"	+	\$90.00	\$76.30 \$64.30
CBC13C	24-1/4"	12-1/2"	18-3/16"	19-1/4" x 12"	+	95.00	80.55 67.90
CBC14C	31"	12-1/2"	18-3/16"	26-1/8" x 12"	+	101.00	84.20 72.15

## Optional Center Panel

P/N	Depth	Width	Height	1-9	10-24	25+
CBCP2C	7/8"	12-1/2"	15-1/8"	+	\$75.00	\$63.60 \$53.60

## INTERMETRO Polyethylene Utility Carts

- Injection-molded shelves resist stains, wipe easily
- Ship's edge contains spills
- Adjustable intermediate shelf
- Chrome-plated posts
- Resilient rubber swivel casters
- 150 lb per shelf, 400 lb per unit
- 33" working height
- BCE1627-34 has enclosed end panels



P/N	Width	Length	Shelf	1-9	10-24	25+
BC1627-24	18"	28"	2	+	\$153.00	\$129.70 \$109.30
BC2030-24	21"	33"	2	+	165.00	139.85 117.90
BC2636-24	27"	39"	2	+	194.00	164.45 138.60
BCE1627-34	18"	28"	3 (enclosed)	+	219.00	185.60 156.50

NOTE: Specify desired color by adding a suffix: TB = true blue, T = teaberry, B = beige, G = gray

## INTERMETRO Wire Shelves, Standard Posts, and Casters

METRO pioneered wire-shelving systems with the development of the tapered-split sleeve. Using this proven method, shelves can be repositioned at precise 1" increments along the length of the numbered posts. All SUPER ERECTA™ posts come with adjustable leveling feet to compensate for uneven floors. Select from a variety of post and shelf sizes to meet your needs.



### Shelves

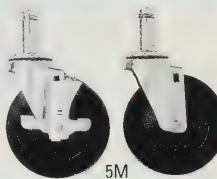
P/N	Description	1-9	10-24	25+
1836BR	18" (W) x 36" (L)	+	\$47.00	\$39.85 \$33.60
1848BR	18" (W) x 48" (L)	+	55.00	46.65 39.30
2436BR	24" (W) x 36" (L)	+	56.00	47.50 40.00
2448BR	24" (W) x 48" (L)	+	66.00	55.95 47.15

### Posts

P/N	Description	1-9	10-24	25+
33P	33" post	+	\$12.50	\$10.60 \$8.95
54P	54" post	+	15.50	13.15 11.10
63P	63" post	+	17.00	14.45 12.15
74P	74" post	+	18.50	15.70 13.25
86P	86" post	+	22.50	19.10 16.10

### Stem Casters

Use with SUPER ERECTA posts and shelves to create a mobile shelving unit to meet your special needs.



P/N	Description	1-9	10-24	25+
5M	Stem swivel, 5" resilient caster	+	\$20.80	\$17.65 \$14.90
5MB	Stem swivel, 5" resilient braking caster	+	25.40	21.55 18.15

### Conductive-Stem Casters

When used in conjunction with aluminum split sleeves and a grounding cable, METRO's conductive casters insure SUPER ERECTA mobile units are properly grounded to conductive floor surfaces.

P/N	Description	1-9	10-24	25+
5MC	Stem swivel, 5" conductive caster	+	\$39.20	\$33.45 \$28.65
5MBC	Stem swivel, 5" conductive braking caster	+	41.50	35.25 29.65

### Posts for Stem Casters

These posts are provided without the leveling-bolt assembly in order to accept the stem casters.

P/N	Description	1-9	10-24	25+
33UP	33" posts, for stem casters	+	\$12.50	\$10.60 \$8.95
54UP	54" posts, for stem casters	+	15.50	13.15 11.10
63UP	63" posts, for stem casters	+	17.00	14.45 12.15
74UP	74" posts, for stem casters	+	18.50	15.70 13.25

## Aluminum Split Sleeves

These are required for ESD applications and high-temperature situations (+120 °F).



P/N	Description	1-9	10-24	25+
9986Z	Aluminum split sleeves with zinc rings	+	\$7.00	\$5.95 \$5.00
9986S	Aluminum split sleeves with stainless rings	+	7.50	6.40 5.40

## Grounding Cable

This cable provides an effective method of electrostatic discharge for any METRO wire-shelf unit (stationary or mobile) when used in conjunction with aluminum split sleeves and conductive casters. The spring-loaded-clamp method of attachment allows for fast, trouble-free installation, and ensures a conductive path to the ground when it is used with ESD flooring.



P/N	Description	1-9	10-24	25+
ASK16S	ESD grounding cable	+	\$14.00	\$11.90 \$10.00

## INTERMETRO SUPER ADJUSTABLE SUPER ERECTA SHELF® WIRE SHELVING™



This is the most advanced and innovative wire storage system available. A unique corner release system and SITESELECT™ posts make changing shelf levels fast and easy—without tools. And SUPER ADJUSTABLE SHELVING works in conjunction with the entire SUPER ERECTA system of shelves and accessories.



P/N	Description	1-9	10-24	25+
A1836BR	18" (W) x 36" (L)	+	\$49.00	\$41.55 \$35.00
A1848BR	18" (W) x 48" (L)	+	57.00	48.35 40.75
A2436BR	24" (W) x 36" (L)	+	58.00	49.20 41.45
A2448BR	24" (W) x 48" (L)	+	68.00	57.65 48.60
A9985	Additional sleeves/wedges, 4/pkg.	+	4.10	3.50 2.95

NOTE: Other widths and lengths are available upon request.



Products with this symbol ship directly from the manufacturer.

Continued



## INTERMETRO METROMAX Q® ESD Storage and Transport System

METROMAX Q ESD storage and transport shelving gives you the power to create a flexible, productivity-based material-handling system that offers the safety of ESD construction along with the protection of cushioned polymer shelf surfaces.

- The unique corner design allows you to assemble and reposition shelves easily—without tools



**NEW**

## RUBBERMAID X-TRA™ Instrument Cart

- Locking doors keep important tools and valuables safe
- Sliding top drawer and easy-to-clean shelves
- Large nonmarking casters
- Easy "pound-together" assembly
- 300-lb capacity



**NEW**

P/N	Description	Each
4094-00	Cart, 40-5/8" x 20" x 37-13/16" (L, W, H), grey	\$320.00

## RUBBERMAID Trades Cart

This cart is a total tool-storage and mobile-work-bench system.

- Top shelf: 150-lb capacity
- Bottom shelf: 200-lb capacity
- 4 compartmentalized parts boxes (2 at each end) store assorted parts and hardware—adjustable and removable for versatility
- 2 storage bins hold essential hand tools and supplies
- Designed to move easily over hard surfaces, through doorways, and in and out of elevators
- Flat surface at ergonomic height provides a convenient work area



**NEW**

P/N	Description	Each
6180-00	Trades cart, 38" x 19-1/4" x 33-3/8" (L, W, H), grey with 6" casters	\$264.10

## RUBBERMAID TRIPLE™ Trolley

TRIPLE trolley reduces the lifting and unsafe carrying of heavy loads. It has the ability to transport large, bulky loads efficiently.

- Durable structural-foam deck doesn't rust, dent, or bend
- Non-skid surface helps prevent load from shifting
- Tough plastic construction is easy on walls and doors
- 3-position handle allows you to push, pull, or fold the trolley flat for use as a dolly



**NEW**

P/N	Description	Each
4400-00	Utility-duty model; 32-1/2" x 20-1/2" (L, W); 250-lb capacity; grey	\$102.40
4401-00	Standard-duty model; 32-1/2" x 20-1/2" (L, W); 400-lb capacity; grey	132.40

## RUBBERMAID X-TRA™ Utility Cart

- Sized to carry large loads
- Total capacity: 300 lb (100 lb/shelf)
- Smooth, easy-to-clean construction
- Easy "pound-together" assembly



**NEW**

P/N	Description	Each
4091-00	Utility cart; 40-5/8" x 20" x 37-13/16" (L, W, H); grey	\$199.00

## RUBBERMAID Heavy-Duty Service/Utility Cart

These carts are constructed with heavy-duty molded shelves and side walls. They do not rust, dent, chip, or peel.

- 400-lb capacity, 200 lb per shelf



**NEW**

P/N	Description	Each
4500-00-GREY	30" x 16" x 32-1/4" (L, W, H)	\$160.90
4520-00-GREY	36" x 24" x 32-1/4" (L, W, H)	182.40

## RUBBERMAID Platform Trucks

Rubbermaid platform trucks are built for durability and long wear. Sturdy structural-foam construction won't rust, dent, or splinter.

- Platform truck features 6" dia. x 2" (W) rubber casters
- 4406 has 1 crossbar handle
- 4436 has 2 crossbar handles



**NEW**

P/N	Description	Each
4406-00	Utility platform truck, 24" (W) x 36" (L), 500-lb capacity, grey	\$394.85
4436-86	Standard platform truck, 24" (W) x 48" (L), 1000-lb capacity, grey	551.35

## RUBBERMAID® Flat-Shelf Carts

These versatile flat shelves are designed for productivity and transporting oversized, bulky items.

- All-plastic design provides easy maintenance and quiet operation
- Makes a convenient mobile work surface for sorting and repairs



**NEW**

P/N	Description	Each
4505-00	Cart, 38" x 19" x 33" (L, W, H), beige	\$160.90
4525-00	Cart, 44" x 26" x 33" (L, W, H), beige	182.40



## LYON 48"-Wide Storage Cabinet

This cabinet can hold 2,000 lb of parts, stationery, literature, or supplies. It features a sound-deadening, double-pan door reinforcement for added strength, and a 3-piece welded shelf reinforcement for boosting the load capacity to 400 lb per shelf. 24" doors offer easy access to the cabinet's contents. It has 4 adjustable shelves and a fixed bottom shelf. All shelves are 24" (D), offering more rows in which to stock items. The stock finish is dove grey or putty (light beige). The cabinet is 48" (W) x 78" (H) x 24" (D).

- 48"-wide storage cabinet—nearly 52"



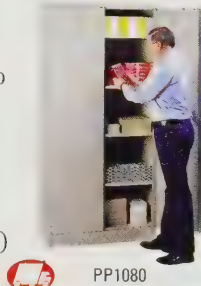
PP1031

P/N	Description	1	2-4	5+
1031	48"-wide cabinet	\$521.05	\$421.20	\$361.05
1058-1	Extra shelf	47.35	38.30	32.80

NOTE: Specify desired color by adding a prefix: DD=dove grey, PP=putty

## LYON 36"-Wide Storage Cabinet

Double doors allow full access to all the areas of this cabinet. The standard 4 shelves are adjustable every 2"; extra shelves are available. The cabinet holds up to 180 lb per shelf for heavy-duty storage requirements. Shelf reinforcements are available. The stock finishes are dove grey or putty (light beige). The cabinet is 36" (W) x 78" (H) x 18" (D).



PP1080

P/N	Description	1	2-4	5+
1080	18" storage cabinet, shipped set up	\$438.85	\$354.75	\$304.05
1081	18" storage cabinet, shipped knocked down	351.05	283.80	243.25
1055-1	Extra shelf for 18" cabinet	25.25	20.45	17.50
1071-1	Shelf reinforcement for 18" cabinet	29.40	23.80	20.40

NOTE: Specify desired color by adding a prefix: DD=dove grey, PP=putty

## LYON Double-Tier Lockers

For shorter coats and jackets, these lockers are 12" wide and have 1 double-prong and 3 single-prong coat hooks. These lockers have no hat shelves and come with 6" legs.



- Price is per opening

DD5222-3

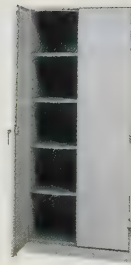
P/N	Size Per Opening	No. of Openings	Each
5222	12" (W) x 18" (D) x 36" (H)	2	\$92.70
5222-3	12" (W) x 18" (D) x 36" (H)	6	75.65

NOTE: Specify desired color by adding a prefix: DD=dove grey, PP=putty

## LYON Heavy-Duty All-Welded Storage Cabinets

These cabinets are extremely tough. Both cabinets are 36" (W) x 21" (D) and come in dove grey only.

- 14-ga, all-welded steel • Shelves reposition on 3" centers • 3-point locking system on doors



DD1114

P/N	Description	1	2-4	5+
DD1112	60" (H) storage cabinet, 3 shelves	\$867.35	\$701.10	\$600.95
DD1114	78" (H) storage cabinet, 4 shelves	977.30	790.00	677.15

## LYON Medium-Duty Closed Shelving

The LYON Series 8000 medium-duty shelving with offset angle uprights delivers 600 lb of load capacity per 36" x 18" shelf. This 22-ga shelf offers extra strength at the front and rear edges. All shelf corners are lapped and welded for strength and durability. Units come in dove grey or putty. Each unit includes 6 shelves and 2 uprights for a free-standing section.



DD8261SM

### 36"-Wide Closed Starter Shelving

P/N	Size	1	2-4	5+
8260SM	36" (W) x 12" (D) x 84" (H)	\$231.05	\$186.70	\$160.00
8261SM	36" (W) x 18" (D) x 84" (H)	259.20	209.55	179.60
8262SM	36" (W) x 24" (D) x 84" (H)	295.75	239.10	204.95

### 36"-Wide Closed-Shelving Add-Ons

P/N	Size	1	2-4	5+
8260M	36" (W) x 12" (D) x 84" (H)	\$180.30	\$145.75	\$124.95
8261M	36" (W) x 18" (D) x 84" (H)	204.70	165.50	141.85
8262M	36" (W) x 24" (D) x 84" (H)	236.15	190.90	163.65

NOTE: More models, styles, and sizes available. Call for information, catalogs, and pricing.

Specify desired color by adding a prefix: DD=dove grey, PP=putty

## MFG Conductive Assembly Trays

These trays provide effective ESD protection for handling static-sensitive parts (electronic components, assemblies, and loaded printed-circuit boards). Made of reinforced thermoset polyester composite material, these trays offer permanent ESD properties. They do not require surface treatments.



P/N	Length	Width	Depth	1-49	50+
218109	22-1/2"	20"	1"	\$19.95	\$17.55
303000	13-1/4"	10-5/8"	1"	12.35	10.90
332000	25-3/4"	17-7/8"	1-1/8"	21.95	19.40
602109	24-1/4"	24-1/4"	1-7/8"	35.50	31.30

NOTE: All dimensions top outside. Other sizes are available.

## AKRO-MILS Shelf Bins

- Built-in hang lock lets bin tilt out for complete access
- Front handle area contains a molded-in label holder
- Wide hopper front allows easy access
- Edges are reinforced for additional strength
- Dividers sold separately
- All are 4" high
- Made from durable polypropylene
- Use on 12", 18", and 24"-deep shelving, or vertical storage and retrieval units
- Outlast corrugated bins and pay for themselves in reduced replacement costs
- 3 colors: red, yellow, and blue



P/N	Outer Dimension	1-199	200-299	300+
30-120	4-1/8" (W) x 11-5/8" (L)	\$1.65	\$1.45	\$1.25
30-124	4-1/8" (W) x 23-5/8" (L)	4.35	3.75	3.20
30-128	4-1/8" (W) x 17-7/8" (L)	2.25	1.90	1.65
30-130	6-5/8" (W) x 11-5/8" (L)	2.55	2.20	1.90
30-138	6-5/8" (W) x 17-7/8" (L)	3.15	2.60	2.20
30-164	6-5/8" (W) x 23-5/8" (L)	6.25	5.45	4.65
30-150	8-3/8" (W) x 11-5/8" (L)	2.75	2.40	2.05
30-158	8-3/8" (W) x 17-7/8" (L)	4.30	3.70	3.20
30-184	8-3/8" (W) x 23-5/8" (L)	7.60	6.60	5.65

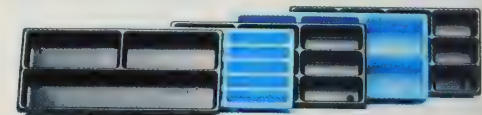
Note: Specify color: red, yellow, or blue.

## Dividers for Shelf Bins

P/N	Description	1-199	200-299	300+
40-120	Dividers for 4"-wide bin	\$8.10	\$7.05	\$6.05
40-130	Dividers for 6"-wide bin	8.80	7.65	6.55
40-150	Dividers for 8"-wide bin	20.55	17.80	15.25

## W.D. ADAM ENDURAL™ Antistatic Parts Trays

All of the trays are 14-3/8" (L) x 6-5/8" (W). They vary only in the number of cavities and height and are available in blue static-dissipative or black conductive material.



P/N	Cavities	Height
PT-1407A-3C*	3	1-3/8"
PT-1407B-3C*	3	2-1/4"
PT-1407B-6C*	6	2-1/4"
PT-1407A-9C*	9	1-3/8"
PT-1407A-12C*	12	1-3/8"
PT-1407B-12C*	12	2-1/4"
PT-1407A-15C*	15	1-3/8"

\*Add suffix "AS" for blue static dissipative. Each \$11.45

\*Add suffix "CD" for black conductive. 14.00



Products with this symbol ship directly from the manufacturer.



Products with this symbol only ship via surface, due to weight or size.



## OLYMPIC Stackable Tote Boxes

These boxes are stackable, fully dividable, and available with snap-on or insert-type covers. Each is injection-molded for longer life and more uniform wall thickness.

- Static-dissipative blue Benstat (BAS)
- Conductive black Bentron (CAS)



P/N	Inside Dimensions	Outside Dimensions	1-49	50-99	100+
<b>TB91035</b>	9-3/16" (L) x 6-9/16" (W) x 3" (D)	10-7/8" (L) x 8-1/4" (W) x 3-1/2" (H)	\$7.45	\$6.20	\$5.30
<b>TB91060</b>	9-3/16" (L) x 6-9/16" (W) x 5-1/2" (D)	10-7/8" (L) x 8-1/4" (W) x 6" (H)	12.15	10.05	8.55
<b>TB92035</b>	14-7/8" (L) x 9-1/4" (W) x 3" (D)	16-1/2" (L) x 10-7/8" (W) x 3-1/2" (H)	12.85	10.75	9.20
<b>TB92050</b>	15" (L) x 15" (W) x 4-1/2" (D)	16-1/2" (L) x 16-1/2" (W) x 5" (H)	21.75	18.00	15.35
<b>TB92060</b>	14-7/8" (L) x 9-1/4" (W) x 5-1/2" (D)	16-1/2" (L) x 10-7/8" (W) x 6" (H)	15.70	13.10	11.25
<b>TB92080</b>	14-7/8" (L) x 9-1/4" (W) x 7-1/2" (D)	16-1/2" (L) x 10-7/8" (W) x 8" (H)	19.85	16.60	14.20
<b>TB93030</b>	20-1/8" (L) x 15-1/8" (W) x 2-1/2" (D)	22-1/2" (L) x 17-1/2" (W) x 3" (H)	27.35	22.95	19.70
<b>TB93060</b>	20-1/8" (L) x 15-1/8" (W) x 5-1/2" (D)	22-1/2" (L) x 17-1/2" (W) x 6" (H)	32.60	27.15	23.25
<b>TB93080</b>	20-1/8" (L) x 15-1/8" (W) x 7-1/2" (D)	22-1/2" (L) x 17-1/2" (W) x 8" (H)	39.40	32.85	28.15
<b>TB93120</b>	20-1/8" (L) x 15-1/8" (W) x 11-1/2" (D)	22-1/2" (L) x 17-1/2" (W) x 12" (H)	47.75	39.80	34.10
<b>TB94650</b>	22-3/8" (L) x 4-1/2" (W) x 4-1/2" (D)	24" (L) x 6" (W) x 5" (H)	17.20	14.35	12.30

NOTE: Use three-letter code suffix to designate material (CAS=Bentron or BAS=Benstat), e.g., SB90443BAS.

## OLYMPIC Vertical Dividers

The vertical dividers for all OLYMPIC plastic tote boxes are available in the same materials as the tote boxes. The vertical dividers fit the long or short direction.

- Snap-on ticket holders fit all OLYMPIC and most other tote boxes
- Tote box covers are designed to snap on or insert into the tote box, and are available in the same material

## OLYMPIC Long Dividers

P/N	Size	1-49	50-99	100+
<b>DL91035</b>	9-3/16" (L) x 3" (H)	\$1.45	\$1.20	\$1.00
<b>DL91060</b>	9-3/16" (L) x 5" (H)	1.70	1.45	1.25
<b>DL92035</b>	14-7/8" (L) x 3" (H)	1.80	1.50	1.30

P/N	Size	1-99	100-199	200+
<b>DL92060</b>	14-7/8" (L) x 5-1/2" (H)	\$2.50	\$2.10	\$1.80
<b>DL92080</b>	14-7/8" (L) x 7-1/2" (H)	3.55	2.95	2.50
<b>DL93030</b>	20-7/8" (L) x 2-1/2" (H)	3.00	2.50	2.15
<b>DL93050</b>	20-7/8" (L) x 4-1/2" (H)	3.25	2.70	2.30
<b>DL93060</b>	20-1/8" (L) x 5-1/2" (H)	3.55	2.95	2.50
<b>DL93080</b>	20-1/8" (L) x 7-1/2" (H)	4.55	3.50	3.25

## OLYMPIC Short Dividers

P/N	Size	1-99	100-199	200+
<b>DS91035</b>	6-9/16" (L) x 3" (H)	\$1.05	\$0.85	\$0.75
<b>DS91060</b>	6-9/16" (L) x 5-1/2" (H)	1.35	1.10	.95
<b>DS92035</b>	9-1/4" (L) x 3" (H)	1.45	1.20	1.00
<b>DS92060</b>	9-1/4" (L) x 5-1/2" (H)	1.95	1.60	1.35
<b>DS92080</b>	9-1/4" (L) x 7-1/2" (H)	2.50	2.05	1.75
<b>DS93030</b>	15-1/8" (L) x 2-1/2" (H)	2.20	1.85	1.60
<b>DS93050</b>	15-1/8" (L) x 4-1/2" (H)	2.55	2.15	1.90
<b>DS93060</b>	15-1/8" (L) x 5-1/2" (H)	2.80	2.35	2.00
<b>DS93080</b>	15-1/8" (L) x 7-1/2" (H)	3.60	3.00	2.60
<b>DS94650</b>	4-1/2" (L) x 4-1/2" (H)	1.75	1.45	1.25

## OLYMPIC Tote Box Covers

P/N	1-99	100+	P/N	1-99	100+
<b>Insert Cover</b>			<b>Snap-On Cover</b>		
<b>CI91000</b>	\$6.15	\$5.45	<b>CO91000</b>	\$6.45	\$5.50
<b>CI92000</b>	9.60	8.45	<b>CO92000</b>	12.05	10.25
<b>CI93000</b>	14.45	12.05	<b>CO92050</b>	15.05	12.80
<b>CI94650</b>	10.65	9.65	<b>CO93000</b>	20.55	17.50
			<b>CO94650</b>	13.80	11.75

NOTE: Insert Cover and Snap-On Cover part numbers correspond to Tote Box series, i.e., CI91000 and CO91000 fit TB91035. Use three-letter code suffix to designate material (CAS=Bentron or BAS=Benstat), e.g., CI91000BAS.

## OLYMPIC Ticket Holders

P/N	Size	1-99	100-199	200+
<b>OP2501BAS</b>	4" (H) x 8" (L)	\$1.35	\$1.15	\$1.00
<b>OP2535BAS</b>	3" (H) x 5" (L)	1.20	1.00	.85
<b>OP2501CLR</b>	4" (H) x 8" (L)	1.25	1.05	.90

## OLYMPIC Stacking Bins

Stacking bins are designed to stack or hang on a storage racks and workstation bin rails.



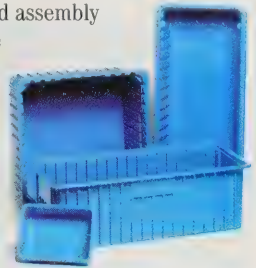
P/N	Size	1-99	100-199	200+
<b>SB90443</b>	5-5/8" (L) x 4-1/8" (W) x 3" (H)	\$2.45	\$2.05	\$1.75
<b>SB90743</b>	7-3/8" (L) x 4-1/8" (W) x 3" (H)	3.25	2.70	2.35
<b>SB91055</b>	10-7/8" (L) x 5-1/2" (W) x 5" (H)	8.25	6.85	5.85
<b>SB91587</b>	14-3/4" (L) x 8-1/4" (W) x 7" (H)	15.80	13.15	11.30
<b>SB91516</b>	14-3/4" (L) x 16-1/2" (W) x 7" (H)	19.90	16.60	14.25
<b>SB90835</b>	8" (L) x 3-1/2" (W) x 4-1/16" (H)	3.80	3.30	2.75

NOTE: Use three-letter code suffix to designate material (CAS=Bentron or BAS=Benstat), e.g., SB90443BAS.

## W.D. ADAM Tote Boxes for Electronics

Here's a variety of space-saving utility containers that are very popular for electronics. Uses include kitting and assembly boxes for the disk-drive industry, and in-plant handling of circuit boards and DIP tubes.

- Blue static-dissipative material



P/N	Length	Width	Height	1-49	50-99	100+
<b>GP-080602AS</b>	8-3/8"	6-1/2"	2"	27.40	25.30	23.95
<b>GP-090602AS</b>	9"	6-1/2"	2"	31.80	29.35	27.25
<b>MTB-01808AS</b>	24"	10-7/8"	8"	19.00	17.55	16.30
<b>MTB-01810AS</b>	24"	10-7/8"	10"	28.25	26.05	24.20
<b>MTB-01550AS</b>	16-5/8"	16-5/8"	5"	37.35	34.50	32.05
<b>MTB-01580AS</b>	16-3/4"	16-3/4"	8"	19.45	17.90	16.65
<b>MTB-01612AS</b>	16-1/4"	16-1/4"	12"	20.60	19.95	17.65
<b>MTB-01905AS</b>	24-1/4"	11-1/4"	5"			
<b>MTB-02505AS</b>	26-7/8"	13-3/8"	5"			

## 3M Conductive-Parts Bins and Assembly Racks

VELOSTAT™ electrically-conductive parts bins are used with the 3M assembly rack to create an organized and grounded system.

The optional assembly rack creates a static-protected system for parts organization at kitting, rework stations, and in storage areas. Each rack contains fourteen rows of four louvers and can be wall-mounted or used free-standing on bench tops. VELOSTAT parts bins hang securely from the louvers. The rack has been zinc-plated so it can easily be grounded, as can the bins hanging on it.



P/N	Size	1-49	50-99	100+
<b>4452</b>	4" (L) x 3.5" (W) x 2.5" (D)	\$6.30	\$5.80	\$5.50
<b>4453</b>	6" (L) x 3.375" (W) x 2.5" (D)	8.10	7.45	7.10
<b>4454</b>	9" (L) x 4.375" (W) x 4.375" (D)	17.35	16.00	15.25
<b>4455</b>	8" (L) x 6.75" (W) x 6.375" (D)	28.35	26.10	24.85
<b>4456</b>	11.875" (L) x 6.625" (W) x 6.375" (D)	36.00	33.80	31.55
<b>4457</b>	11.875" (L) x 14.75" (W) x 6.375" (D)	55.65	51.30	48.85

NOTE: All dimensions are referenced from the inside bottom of the container and are nominal dimensions.

## Assembly-Bin Rack, Zinc-Coated, Black

P/N	Size	Each
<b>4018</b>	17.625" (L) x 18" (W) x 10" (D)	\$91.20



**CCI CORSTAT® NesTTray®**

- Durable 275-lb CORSTAT—highly reusable and recyclable
- Space-saving design



P/N	Description	1-49	50+
7010*	18" x 12" x 6"	\$11.50	\$10.70
7020*	27-1/4" x 12" x 6"	12.95	12.05
7030*	27-1/4" x 18" x 6"	16.25	15.10

\*Shipped assembled with plastic handles

**CCI CP Carousel Trays and Stand**

- Components at your fingertips
- Organize components and your workstation, save shelf space
- Trays rotate to desired position
- Vacuum-formed conductive durable plastic (.125" thick), good for years of use
- Carousel stand holds 3 conductive carousel trays
- Cup inserts available for easy replenishment—sold separately



P/N	Description	1-4	5+
14103	3-high stand set with tray	\$248.70	\$230.90

P/N	Description	1-9	10+
2920D	Cup insert, 2-1/2" (W) at front, 1-1/8" (W) at back x 4-1/2" x 1-5/8"	\$4.90	\$4.55

**AKRO-MILS ESD Akrobins®**

Molded from revolutionary new CARMELSTAT™, these black ESD containers dissipate electrostatic charges which can severely damage sensitive electronic components.

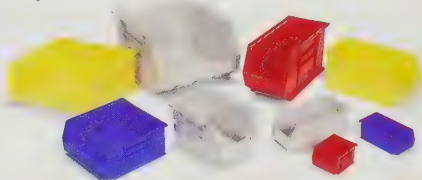
- Constant protection in the static dissipative range of  $10^6$ – $10^9$  ohms
- Low sloughing
- Heavy-duty construction
- Ergonomic design
- Guaranteed not to break



P/N	Outer Dimensions	1-24	25-48	49+
30210ESD	5-3/8" (L) x 4-1/8" (W) x 3" (H)	\$4.80	\$3.50	\$3.00
30220ESD	7-3/8" (L) x 4-1/8" (W) x 3" (H)	6.75	5.00	4.25
30230ESD	10-7/8" (L) x 5-1/2" (W) x 5" (H)	16.35	11.95	10.25
30235ESD	10-7/8" (L) x 11" (W) x 5" (H)	25.10	18.30	15.70
30270ESD	18" (L) x 16-1/2" (W) x 11" (H)	89.50	65.25	55.90

**AKRO-MILS AKRO BINS**

These are the most versatile of bins. They're injection-molded from heavy-duty polypropylene. They're unaffected by weak acids and alkalis, water, and rust. They're corrosion-proof, and autoclavable under 250 °F. They come with: label slots, anti-slide stop, hanger lip for use on racks, panels, rails, and carts, and are available in blue, red, yellow, and stone. Please specify color with suffix (e.g., 30-210-yellow)

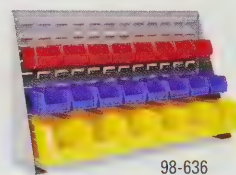


P/N	Outer Dimensions	1-49	50-99	100+
30-210	5-3/8" (L) x 4-1/8" (W) x 3" (H)	\$1.10	\$ .90	\$ .80
30-220	7-3/8" (L) x 4-1/8" (W) x 3" (H)	2.00	1.60	1.40
30-230	10-7/8" (L) x 5-1/2" (W) x 5" (H)	5.00	4.00	3.45
30-235	10-7/8" (L) x 11" (W) x 5" (H)	7.70	6.15	5.25
30-239	10-3/4" (L) x 8-1/4" (W) x 7" (H)	8.30	6.65	5.70
30-240	14-3/4" (L) x 8-1/4" (W) x 7" (H)	9.80	7.85	6.75
30-250	14-3/4" (L) x 16-1/2" (W) x 7" (H)	13.75	11.00	9.45
30-265	18" (L) x 8-1/4" (W) x 9" (H)	16.40	13.10	11.25
30-270	18" (L) x 16-1/2" (W) x 11" (H)	24.80	19.85	17.00

**AKRO-MILS Bench Rack**

These bench racks are ideal for workstations. 98-600 accepts (24) of 30-210 or 30-220, or (12) of 30-230. 98-636 accepts (40) of 30-210 or 30-220 or (18) of 30-230.

- Grey baked-enamel finish
- Bins sold separately

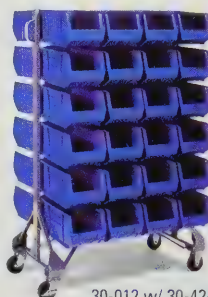


P/N	Description	1-4	5-9	10+
98-600	Bench rack, 27-3/4" (L) x 21" (H) x 8" (W)	\$46.25	\$37.00	\$34.50
98-636	Bench rack, 36" (L) x 21" (H) x 8" (W)	56.30	45.05	42.05

**AKRO-MILS Bin Rack and Mobile Kit**

This 2-sided rack has 12 rails and accepts 5 sizes of AKRO BINS. It accepts (192) of 30-210 or 30-220, (48) of 30-239 or 30-240, or (24) of the 30-250 AKRO BINS. Add the mobile kit to convert the rack into a mobile cart. This adds 5-1/2" to the height. It includes reinforcing braces, handle, and 4" polyolefin wheel casters (rear caster locks to prevent rolling).

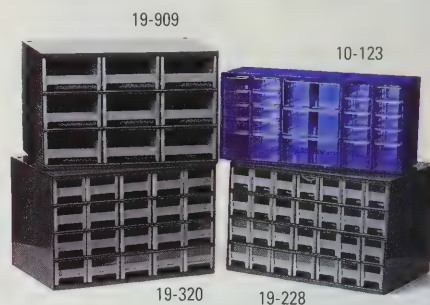
- Rack measures 36" (L) x 20" (W) x 53" (H)
- 500-lb capacity
- Bins sold separately



P/N	Description	1-4	5-9	10+
30-012	Rack, 2-sided, 12-rail	\$166.65	\$133.30	124.45
30-424	Mobile kit	80.95	64.80	60.45

**AKRO-MILS Modular Cabinets**

- Store and organize your small parts inventory in these compact cabinets
- Transparent plastic drawers let you view the contents
- Charcoal-grey baked-enamel finish
- Heavy-duty, strong welded steel to provide years of service
- All frames are 17" (W) x 11" (D) x 11" (H)
- All drawers are 10-9/16" (D)
- 19-109 is a security cabinet with locking door



P/N	No. of Drawers	Drawer Inside Dimensions	1-4	5-9	10+
19-228	28	2-3/16" (W) x 2-1/16" (H)	\$84.90	\$63.65	\$59.40
19-320	20	3-3/16" (W) x 2-1/8" (H)	84.90	63.65	59.40
19-909	9	5-3/16" (W) x 3-1/16" (H)	84.90	63.65	59.40
19-416	16	4" (W) x 2-1/8" (H)	84.90	63.65	59.40
19-715	15	3-3/16" (W) x 3-1/16" (H)	84.90	63.65	59.40
19-109	9	5-3/16" (W) x 3-1/16" (H)	114.70	86.05	65.00

**AKRO-MILS Plastic-Frame Cabinets**

- 1-piece, high-impact, polystyrene frame construction
- Pedestal bases allow cabinets to be stacked on top of one another
- Blue • 18-1/4" (W) x 8-5/8" (H) x 6-3/8" (D)

P/N	No. of Drawers	1-4	5-9	10+
10-156	36	\$20.95	\$17.95	\$16.75
10-123	23	20.95	17.95	16.75
10-118	18	20.95	17.95	16.75

**FLAMBEAU ROTOTOWER™ Conductive-Plastic Storage-Cabinet System**

The ROTOTOWER system holds 16 each of the C26P-C or U45P-C plastic-frame conductive storage cabinets. Its highly stable tower design provides effortless turning on a ball-bearing base—allowing you to quickly and easily select stored items.

- Uses only 3 sq ft of floor space
- Easy to assemble
- Feet have "level" adjustments to compensate for floor irregularities
- Perfect for stockroom or production/assembly areas



161-CRT

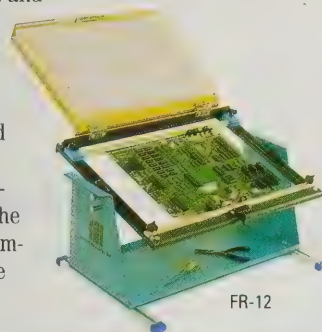
P/N	Description	Each
161-CRT	ROTOTOWER	\$262.25
C26P-C	Conductive-plastic cabinet, 26 drawers	90.50
U45P-C	Conductive-plastic cabinet, 45 drawers	90.50



## FANCORT FLIP RAKS Assembly Fixtures

FLIP RAKS are the easiest to use assembly fixtures for working on both sides of a circuit board. There are two comfortable working angles (15° and 45°), effortless rotation, and automatic re-locking.

- 1 spring-loaded rail and 1 standard rail with easy adjustment and automatic re-locking
- Heavy-duty hardware, rugged steel and aluminum construction
- Anti-static foam on the cover to hold components in place



FR-12

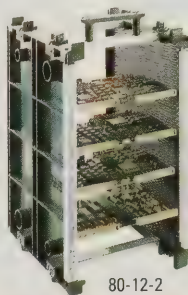
P/N	Max. Capacity: (1 Board)	Max. Capacity: (2 Boards)	Base Dimensions	1-4	5+
FR-9	8-1/2" (L) x 17" (W)	3-1/2" (L) x 17" (W)	20" (L) x 10" (W)	\$360.00	\$341.80
FR-12	11-3/4" (L) x 18-7/8" (W)	5-1/4" (L) x 8-7/8" (W)	22" (L) x 10" (W)	390.00	370.25
FR-17	17-1/2" (L) x 21" (W)	8" (L) x 21" (W)	25" (L) x 10" (W)	435.00	412.65

## FANCORT FLIP RAKS Assembly Fixtures, Low-Profile

P/N	Max. Capacity: (1 Board)	Max. Capacity: (2 Boards)	Base Dimensions	1-4	5+
FRLP-9	8-1/2" (L) x 17" (W)	3-1/2" (L) x 17" (W)	19" (L) x 12-1/2" (W)	\$200.00	\$189.90
FRLP-12	11-3/4" (L) x 18-7/8" (W)	5-1/4" (L) x 8-7/8" (W)	21" (L) x 16" (W)	245.00	232.60
FRLP-17	17-1/2" (L) x 21" (W)	8" (L) x 21" (W)	23-1/2" (L) x 21-1/2" (W)	255.00	242.10

## FANCORT MODEL 80 KARRY-ALL PCB Handling Rack

- Unique design allows units to be stacked 3 different ways
- Completely adjustable
- Heavy reinforcing ribs and a steel stiffener to prevent flexing
- Injection-molded from carbon-filled polypropylene for ESD protection
- 75 slots
- Thumb-screws, to use the racks without tools, are standard
- Complete rack includes: 2 card guides with 4 aluminum extrusions and hardware

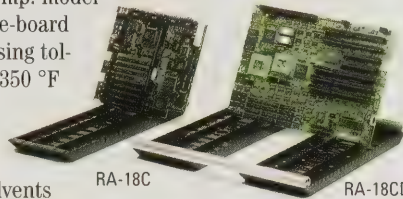


80-12-2

P/N	Max. Opening	Overall Dimensions	1-4	5+
80-12-2	12"	18-3/4" (L) x 14" (W) x 12-1/2" (D)	\$78.00	\$74.00
80-18-2	18"	18-3/4" (L) x 20" (W) x 12-1/2" (D)	82.00	77.85

## FANCORT RA-18 Series PCB Handling Rack

- Measures 6" x 18" and weighs .5 lb
- 25 slots with parallel sides for more rigid holding measure .125" x .300" on a .625" pitch
- Undercut ends for carrying handles
- Double-wide models that expand to hold boards up to 24" (W) have carrying handles and measure 20" (W) x 18" (L)
- Very high-temp. model for bare-board processing tolerates 350 °F acids, alkalis, and solvents



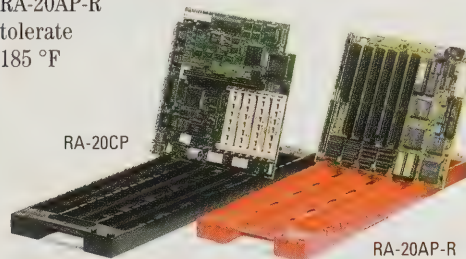
RA-18C

RA-18CD

P/N	Description	1-49	50+
RA-18C	Standard (185 °F) conductive	\$11.00	\$10.45
RA-18CT	High-temp. (275 °F) conductive	32.00	28.35
RA-18HT	Very high-temp. (350 °F)	34.00	28.35
RA-18CD	Double-wide conductive	40.00	38.00

## FANCORT RA-20 Series PCB Handling Rack

- Measures 7" x 20" and weighs 2 lb (RA-20CP)
- 20 slots with easy-to-load angle measure .125" x .325" on a .750" pitch
- Rugged construction with heavy reinforcing ribs
- Open carrying handles and drainage holes
- Stackable when not in use to conserve space
- Optional low-cost standard plastic model without ESD protection
- RA-20CP and RA-20AP-R tolerate 185 °F



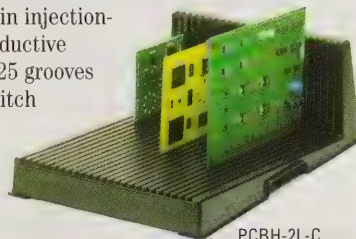
RA-20CP

RA-20AP-R

P/N	Description	1-49	50+
RA-20CP	Standard, black, conductive	\$15.00	\$14.25
RA-20AP-R	Non-ESD, standard, red plastic	10.00	8.90

## FANCORT Angle Rack

- Available in injection-molded conductive
- Features 25 grooves on a .400" pitch
- Vertically stackable and nest when not in use



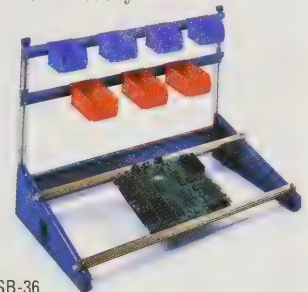
PCBH-2L-C

P/N	Size Dimension	Groove Capacity	PCB	1-49	50+
PCBH-2L-C	10-1/4" (L) x 13-3/4" (W) x 5" (D)	.100" (W) x .187" (D)	12" (W) x 15" (L)	\$16.00	\$14.95
PCBH-C	10-5/8" (L) x 8-1/8" (W) x 3-5/8" (D)	.125" (W) x .200" (D)	6" (W) x 9" (L)	10.00	9.50

## FANCORT COMBO-SLIDE

The COMBO-SLIDE is for assembly of printed-circuit boards up to 18". Its sturdy steel frame and easy-glide PCB slide rails allow it to be used as a stand-alone workstation or easily interconnected for progressive assembly.

- Can hold 18 boards
- Available in 2', 3', or 4' sections
- Bin rack sold separately



CS-36/CSB-36

P/N	Description	Each
CS-24	2-ft COMBO SLIDE w/2 PCB slide rails	\$130.00
CS-36	3-ft COMBO SLIDE w/2 PCB slide rails	140.00
CS-48	4-ft COMBO SLIDE w/2 PCB slide rails	150.00
CSB-24	2-ft parts-bin rack w/2 stringers (24" high)	50.00
CSB-36	3-ft parts-bin rack w/2 stringers (24" high)	55.00
CSB-48	4-ft parts-bin rack w/2 stringers (24" high)	60.00

## OK INDUSTRIES Circuit-Board Holder

- Frame rotates a full 360°
- Steel-backed foam cover opens to expose components, testing or assembly work
- Spring-loaded guides to accommodate various board sizes
- Cover closes and locks to hold components in place

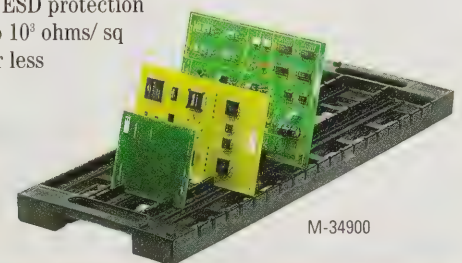


PCBH-70

P/N	Max. Board Size without Center Bar	OD	1-4	5+
PCBH-70	19.6" x 8.6"	25" x 11-3/4"	\$240.00	\$222.90
PCBH-90	19.6" x 13.8"	25" x 17"	325.00	304.80

## MARSHALL PCB Material-Handling Rack

- Made from conductive polypropylene for ESD protection
- Holds 20 boards
- 8-1/2" (W) x 23" (L)
- ESD protection to 10<sup>3</sup> ohms/sq or less



M-34900

P/N	Description	1-49	50-99	100+
M-34900	Conductive rack	\$14.95	\$14.25	\$12.35



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- For complete terms and conditions of sale, please contact our sales department at 800 765-6268, or you may view a copy on our website: **www.4atonce.com**.

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Chemicals ship via surface transportation only. An additional charge imposed by UPS of \$10.00 applies to each package containing chemicals.

\*Does not apply to hazardous material shipments or items that are freight intensive. Items that are freight intensive are identified with a truck symbol, and shipped via motor carrier.

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CREDIT CARDS—Add freight charges as follows:

<b>\$30.00 to \$100.00 add:</b>	<b>\$9.00</b>
<b>\$100.01 to \$350.00 add:</b>	<b>\$15.00</b>
<b>\$350.01 and up add:</b>	<b>\$18.00</b>

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Quantity	Part Number	Page	Price Each	Total

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Add freight charges as follows:

\$30.00 to \$100.00 add: .....\$ 9.00  
\$100.01 to \$350.00 add: .....\$ 15.00  
\$350.01 and up add: .....\$ 18.00

A packing and handling fee of \$4.50 is added to the order.

Orders under 70 lb are shipped UPS 2nd-day air.

Orders over 70 lb are shipped best economical way.

This does not apply to hazardous material shipments or items that are freight intensive. Items that are freight intensive are identified with a truck symbol.

## Open Accounts

Actual freight charges are added to the invoice. A packing and handling fee of \$4.50 is added to the order. \$100 minimum order for new open accounts.

NOTE: Items identified with a truck symbol are shipped via motor carrier. Please inquire to obtain shipping charges.

Chemicals ship via surface transportation only. An additional charge imposed by UPS of \$10.00 applies to each package.

## Special Requirements

Please include specific instructions if you require special packing, marking, shipping, routing, and insurance.

Merchandise Subtotal

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Shipping (See Terms and Conditions)

Total

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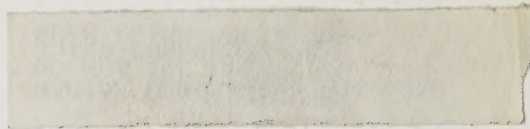




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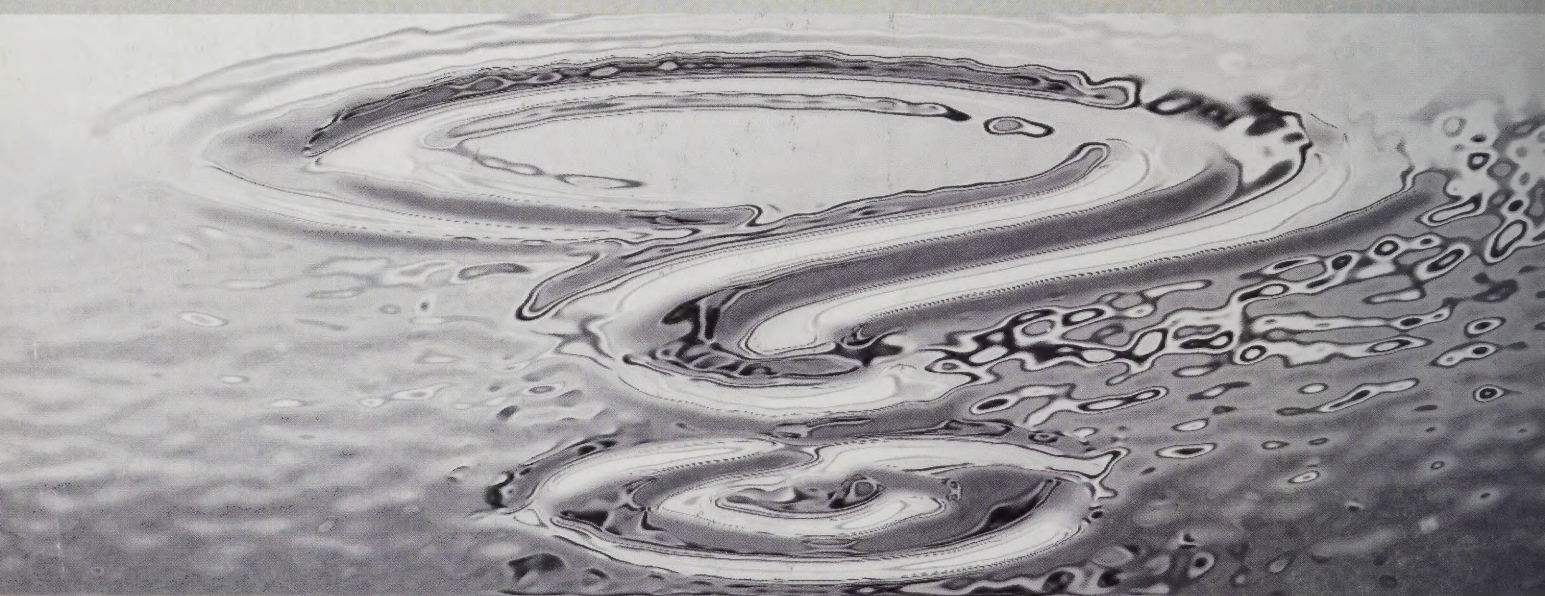
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